September 3, 1963

B 2/7

NOTES 9/3/63 CONSTAN

Negative Report

B 9/7

NOTES 9/3/63 DAVIS

No Notes.

NOTES 9-3-63 FORTUNE

1. Errors in Last Week's Notes on S-II Test Stand: Errors in transmission fouled up my notes on the savings we could accrue by slipping the Dual Stand (and not Seal Stand as written) for the portion on MSFC Component Test Facility; the amount should have been approximately .47M, not 1.7M as written. Shepherd later told me we could not delay the MDE procurement of High Pressure Water Pumps and save 2.9M as he originally thought. Since the MTF Working Group is following up on the request for extra funds from NASA Headquarters, I agreed with Heimburg that they do keep you informed on the subject.

2. Visit by Regional Engineer: General Welling from Atlanta called on me last Monday on his way to General McMorrow's funeral. He was pleased to see all the progress in construction being made at MTO.

3. Equal Employment Opportunity Considerations: Civil Service Clerical exams again were given by Keesler Air Force Base personnel at our office this past Wednesday. There were no colored applicants on this occasion, although the two girls that failed the previous exams indicated that they would come back to try again. We are reviewing our projected hiring plans and at Marion Kent's suggestion will send Bill Winterstein to Xavier and Dillard Universities in New Orleans to see if they have any qualified personnel who would wish to apply for our vacancies.

4. Unsatisfactory Food Contractor: Sometime ago, we agreed to let the Corps of Engineers contract for a mobile canteen service to themselves and construction contractor personnel. General Electric was still to provide such service for their own employees and ours. The contractor hired by the Corps provided unsatisfactory food on several occasions and was fired this week. Colonel Raymond has not yet decided whether to negotiate with W. F. Findley who has been providing very good food to us or readvertize. Because it is so far to any restaurant, practically everyone is prepared to bring their own lunch, until other arrangements can be made. Meanwhile, those who desire blue-finned crab, green trout, Biloxi bacon (mullet), or barbecued pig can catch their own.

NOTES 9/3/63 GEISSLER

1. Saturn IB Performance: Performance of the Saturn IB operational vehicle (SA-205) has been calculated based on revised thrust and weight data provided by P&VE. Payload was determined to be 32,560 pounds in a 105 n. m. circular orbit. Primary reason for increased payload capability is an increased estimated thrust and specific impulse of the H-1 engine. Current weights (i. e. prior to weight reduction program) were used with allowances for 4 1/2 hours coast in orbit and NPSH modification on the S-IVB stage. This supercedes information published previously in item 7 of Notes 8/19/63 Mrazek.

2. Apollo Mission Control Support: A Mission Control Operations Panel meeting (without MSC participation) was held at MSFC on August 27. The MSFC concept was presented. While it was agreed that MSFC will staff all necessary flight controller support at the remote sites and IMCC, LOC surprisingly objected to the Huntsville Operations Support Center being the focal point for the operations support during S-IVB/IU orbital checkout. LOC proposed to be the sole contact point to IMCC from prelaunch through orbital operations and S-IVB separation. According to your instructions, the MSFC proposal will be presented unchanged to MSC in the next panel meeting on September 13.

3. Apollo Re-Entry: Work is in progress to determine the capability of Saturn IB/S-VI for the Apollo reentry heat shield qualification using two burning periods of the S-VI propulsion system. Preliminary results have indicated some conditions under which we can deliver an S-VI stage cutoff weight of 19,000 pounds into the desired reentry conditions. This is approximately equivalent to 9400 pounds of payload which is probably sufficient for the mission.

NOTES 9-3-63 GRAU

1. S-I-6 POST-STATIC CHECKOUT: Final electrical checkout of the S-I-6 is continuing, with satisfactory results, in checkout station B of building 4708.

* 2. S-IU-6 FINAL CHECKOUT: Electrical Network Functional Tests part I (Power distribution, component tests and general electrical network verification) and part 2 (Flight sequencer program checkout) were completed successfully in five hours using the RCA-110. Checkout in the manual mode had taken about two days on the SA-5 Instrument Unit.

3. S-I-7 PRE-STATIC CHECKOUT: Pre-static checkout of the S-I-7 stage was completed and the vehicle turned over to Manufacturing Engineering Division on August 23, 1963.

4. NORTH AMERICAN AVIATION SYSTEM MEASURING DEVICES: Review of NAA System Measuring Devices drawings reveals that NAA plans an individual test set for each component, sub-system, system, rack console, etc. To prevent excessive expense and unnecessary test equipment the System Checkout Working Group and the Electrical Design Integration Working Group will give this area further attention.

5. NPC-200-Y SOLDERING SPECIFICATION: An MSFC position, incorporating each division's concepts, on the proposed NPC-200-Y soldering specification has been formulated and a letter transmitting this information to NASA Headquarters is being prepared for Dr. Rees' signature.

* 6. QUALITY PRESENTATION: At the request of LOC, representatives of the Quality Assurance Division gave presentations on the NASA Quality Assurance Program to a few groups of GE and NASA personnel at Daytona Beach, Florida. NASA personnel included those in residence at the GE facility, representatives from LOC Quality Assurance office and the Procurements and Contracts Office.

7. RELATIONSHIP TO MSC IN THE QUALITY AND RELIABILITY ASSURANCE AREA: Mr. George Lemke, former resident manager for MSC in S&ID at Downey, California, on the Apollo contract was given a special assignment on Dr. Gilruth's staff. He is to prepare the establishment of a Quality and Reliability Assurance organization with responsibility and authority in MSC. After visits with the office of Reliability and Quality Assurance in NASA Headquarters and with the Lewis Research Center he spent 2½ days last week with me and members of my staff for orientation.

NOTES 9-3-63 GRUENE

1. SA-5 Schedule: A more firm SA-5 schedule could not be worked out since promised modification schedule of DAC was delayed. We are still trying to work toward a December 6 to 13 launch period.

2. Visit of Dr. Mueller to LOC: Dr. Mueller will visit LOC on September 12 and 13 with an LVO briefing on September 13.

3. LVO Reliability and Quality Assurance Representative: LVO hired Mr. Erwin W. Priddy of the Safety Office as LVO reliability and quality assurance representative at LOC.

NOTES 9/3/63 HAEUSSERMANN

1. RATE GYROS FOR SATURN I EDS. A decision has been made to use the triple redundant rate gyro package and its processor in the Saturn I EDS. Installation will begin with SA-10.

2. SATURN ALIGNMENT LOOPS. In May 1963 we reported a plan by which the Saturn theodolite and azimuth alignment loops would be realistically checked out. This plan calls for the use of Pad 37B as the test site to take into account operational variables such as air shimmer noise and various electrical noises that appear under actual conditions. The ST-124 for SA-6 vehicle has been shipped to L VOD for incorporation in the special interface laying tests to be performed between 8/27 and 9/9.

3. ELECTRON BEAM WELDING OF ELECTRONIC COMPONENTS TO PRINTED CIRCUIT BOARDS. Introduction of the microcircuit in standard packages has made it possible to use a jig to hold and ground up to 16 joints with a simple standard holder. This resultant elimination of the "metal halo" problem coupled with the use of nickel and Kovar printed circuit board material to overcome copper thermal problem has resulted in highly successful electron beam welding of microcircuits to epoxy fiberglass printed circuit boards without heat effect to the plastic.

NOTES 9/3/63 HEIMBURG

1. J-2 (S-IVB) ENGINE TEST STAND:

Bids were opened 8/28/63, at Mobile Corps of Engineers Office. The low bid from Keminer Construction Company, plus contingencies, was approximately $100,000.00 over programmed funds. Reprogramming is pending in Facilities Engineering Office. Money is available from the Static Test Tower adaption hardware item for the F-1 engine, which is being done inhouse rather than by contract. No date of award of contract or start of construction can be given today.

2. F-1 TURBOPUMP STAND:

Erection of structural steel adjacent to the Cold Calibration Test Stand was started last week. Beneficial occupancy date, 11/1/63; activation scheduled 4/1/63.

3. MARINE ACTIVITIES:

Barge PROMISE arrived MSFC dock, 8:15 a.m., today, 9/3.

4. MTF WORKING GROUP:

The MTF Planning Board met on 8/29. It was agreed that an outline of the MTF Activation Plan will be presented at the next meeting, scheduled 9/26. This outline plan will include the facility activation plan, together with the manpower phase-over of the MTF Working Group.

NOTES 9-3-63 HOELZER

B 9/7

No Report.

NOTES 9-3-63 HUETER 3 9/7

1. APOLLO LOGISTICS SUPPORT PROGRAM: A meeting with Major Tom Evans, OMSF, which was tentatively planned for Tuesday, Aug. 27, to discuss our recommendations on the Lunar Environmental Facility was called off due to prior commitments on his part. His office is still reviewing our document, which we furnished you for the OMSF Management Council Meeting, and will get with us at a later date.

It is tentatively planned now to have a briefing for Mr. Weidner on our Lunar Support activities on Thursday afternoon, Sept. 5. Each functional group head will present the activities associated with his area of work.

Efforts are continuing to develop as realistic development and test schedules for the Apollo Logistic Support System utilizing the PERT structure. Early indications from the schedule developed so far predict as late 1969 or early 1970 launch availability. ✓

2. MMM: OSS and JPL are supporting Mr. Holmes' letter to Dr. Seamans requesting that MMM be included in the FY '65 budget. ✓✓

3. SATURN IB/CENTAUR/VOYAGER STUDY: The current schedule for significant events during the final phases of the Centaur/Voyager study are as follows:

a. Sept. 30 - Centaur Study Presentation to Dr. von Braun (9 a.m., Director's conference room, participants: MSFC, STL, and LOC).

b. Oct. 2 - Submission of Centaur Study final presentation material for NASA Headquarters to Dr. von Braun's office.

c. Oct. 4 - Presentation of Centaur Study to NASA Headquarters/OSS including submission of MSFC final report and recommendations (participants: MSFC, STL, and LOC).

d. Oct. 8 - Distribution of STL S-IB/Centaur/Voyager Vehicle Control Analysis for insertion in the STL final report.

e. Oct. 15 - NASA Headquarters/OSS presentation to Dr. Seamans on the Study of a Saturn IB Third Stage for the Voyager Mission. ✓

NOTES 9-3-63 Koelle

B 9/7

1. SYSTEMS MEETING

Last week we had a systems meeting on advanced large chemical launch vehicles, with the "big 6" airframe and the "big 3" engine contractors participating. Each of them gave a 30-minute presentation on propulsion system requirements and technical alternatives for new large launch vehicles in the SATURN class and larger. NASA Headquarters also participated and, of course, our MSFC laboratories. The minutes include a summary of the present assessment of the overall situation. This meeting was considered successful and even approved by the contractors, which was surprising, since competitors have never listened to each others stories before. It was a very lively discussion, as you may imagine. Would you like to have a copy of the minutes, which should be available in about one week? WVK - Yes, certainly! B

2. PROGRAM DEFINITION PHASE

Currently, we have only one approved study which falls in this class (annual study level of effort larger than one million dollars). Two more might come our way this fiscal year (Tripple M stage and Lunar payloads). Our projection is that approximately 15 study projects may enter the program definition phase during the next ten years. The average program definition phase will last about two years. It is our estimate that only 20 to 25 percent of all projects entering the program definition phase will enter the hardware stage. Would you like to have a copy of our list of candidate systems which might enter a program definition phase in the next ten years? Yes, [illegible] B

3. LUNAR ELECTRIC FERRY VEHICLE

In my last week's NOTES, you asked whether the lunar electrical ferry vehicle will also have a RIFT-type stage for acceleration to escape velocity as the planetary nuclear electric ferry vehicle (as proposed by G.E.). The answer is No, because the velocity increment to be added is too small to leave room for two different propulsion systems. The lunar electric ferry vehicle is probably only suitable for cargo delivery, because of the long trip time (one month).

WVK - Is it not also severely penalized by shielding requirements generated by long stay time in Van Allen Belts. (if manned)? B

NOTES 9-3-63 KUERS

1. Saturn V, S-IC Stage:

a. Welding of the lower fuel bulkhead on the Meridian Welder has been started. Late delivery of acceptable gore segments has created a slight delay for this operation. This bulkhead is chemically milled on the inside and has 8 outlets of various sizes.

b. On Wednesday, August 28, 1963, while unloading the vacuum chuck for the Meridian Welder at Michoud a fire developed while cutting the fixture loose from a flat bed by use of an acetylene torch and partially destroyed the fixture. The first use for the fixture is scheduled in building the S-IC-S upper fuel bulkhead to be delivered to MSFC in February 1964. Extent of damage: all rubber parts including lip seals and epoxy build-up are destroyed, the frame might be warped. Impact on schedule is not determined yet, but could amount to 30 days delay on S-tank. There is a possibility that we could build this bulkhead in-house.

c. A serious problem has developed with respect to the utilization of the Kearney and Trecker tape controlled skin milling machines at Wichita. There are 3 of these Air Force owned machines available at Wichita, 2 of which have been modified to accommodate our work. In spite of former assurances by Boeing that full time on 2 machines would be available for Saturn work we learned now that until March 1964 only 65% of the capacity of 2 machines can be utilized for S-IC work. The remaining capacity is being used for B-52 wing panels and for the B-727 airplane. These machines are run 7 days a week on 3 shifts. Sub-contracting of our work to other companies would result in substantial delays of our program because the capacity of all such numerical controlled milling machines in this country is sold and committed up to 2 years in advance. We might, therefore, have to force Boeing, based on our priority, to give preference to our Saturn work and delay B-52 or B-727 work. This subject has been brought to the attention of the highest corporate level at Boeing. Mr. Lyle A. Wood, Vice President, Aero Space Division, Mr. C. B. Gracy, Vice President, Manufacturing, Corporation Headquarters, and Mr. Ben Wheat, General Manager, Wichita Branch, are meeting on Tuesday, September 3, in Wichita for review of this problem.

2. Saturn I, SA-5: This week we are sending 6 people to LOC for installation of Turbine Exhaust Duct Fairings on SA-5. These fairings have been modified by Hayes and are now ready for installation.

3. Saturn V, S-II Stage: (Reference your remarks to my NOTES 8-26-63) In order to alleviate the tight situation for the Bulkhead Assembly Shop at Seal Beach, I would recommend to speed up (1) the construction of the storage building which is now in the FY-64 facility program and (2) also give top priority to the bridge crane enclosure which is an item in the FY-65 program.

NOTES 9-3-63 LANGE B 8/7

1. SATURN I/IB- Work on SA-5 is progressing satisfactorily.

Saturn IB Technical Review on performance, missions, configurations and weight control has been rescheduled for 9-17-63. Earlier the Saturn IB Apollo Missions and Configuration will be reviewed and approved by the Director of MSC 9-9-63. MSC will then present these approved plans to MSFC. ✓

S-IV-5 and S-IV-6- Re Notes 7-15-63 GRAU (Attachment 1)- Correspondence and meetings have occurred between M-SAT (Col. James and Mr. Ferguson) and Quality M-QUAL (Mr. Grau and Mr. Klauss). It could only be concluded that the history of these items included some misunderstandings and some judgment or procedural mistakes by both M-SAT and M-QUAL. The important thing, it was concluded, is to correct these problems for the future. Plans were agreed to which utilize the new recording equipment for S-IV-7 post manufacturing checkout and for S-IV-6 post static checkout. Methods were also agreed to for finalizing post manufacturing procedures. ✓

2. SATURN V- S-IC-T Task Force Meeting on 8-27-63 discussed 16 problem areas and made assignments for follow-up action. Next meeting is scheduled for 9-3-63 at M-SAT. O.L.

While attempting to unload the tool for the Bulkhead Gore at Michoud, the crew utilized a burning torch to cut holddown fixtures. Result, the vacuum cups and bladders were set afire and destroyed. This tool is allocated to the buildup of bulkheads at Michoud for MSFC assembled stages. Boeing has been requested to assess program impact. Preliminary reply is expected by 9-4-63. Who pays for damages? B

S-II- Based on the success of age-forming the S-IC tank skin segments, NAA is currently embarking on a program to machine a tool-proof LH_2 panel in the T4 condition and then age-form to T6. ✓

The contractor has formed a team effort to concentrate on the battleship. Problem areas are: electrical GSE, system procedures, and preparation of purchase orders for procurement of components, tank completion by Pittsburg Des Moines-Moline and thrust structure. ✓

The hydraulic system accumulator-reservoir manifold assembly which previously failed, is being modified by using forged aluminum in lieu of an aluminum casting. ✓

The forward common thin gores for the seal-strip backup method must be formed explosively since the backup stretch forming press will not be able to pull the thicker material required for the seal-strip designed gore. ✓

NOTES 9-3-63 MAUS

1. ACTIVATION OF NEW ORGANIZATION - I have designated Management Analysis Office as responsible element for coordinating the implementation of the MSFC reorganization. The functional statements for the new or affected elements are being developed as rapidly as possible, as we are required by headquarters to submit functional responsibilities for the supergrade positions by September 13, 1963.

2. FY 65 BUDGET SUBMISSION - Presently, we are coordinating two major budget efforts with deadlines as follows:

   September 16, 1963 - submission to Program Offices and Associate Administrator of Preliminary FY 65 Budget Estimates. This will be an interim submission, and is being prepared by the Project Offices, Financial Management Office and Executive Staff. Problem areas related to this are:

   (1) Program Office funding guidelines were received only last week.
   (2) Schedule guidelines still not officially received from headquarters.
   (3) OMSF requests submission with detail thru contractor level, and thru program runout.

   We are requesting OMSF to agree to including detail to stage level only, rather than contractor level, and for FY 64 and FY 65 only, rather than through program runout.

   November 15, 1963 - Final FY 65 budget submission to Program Offices and Associate Administrator. Problem areas related to this are:

   (1) Program Office final guidelines will not be received until October 25, 1963.
   (2) We will be somewhat constrained by our September 16 submission, particularly if we are required to give runout costs in the Sept. 16 submission.

   This submission will be prepared with inputs from the laboratories and Project Offices and in accordance with the new MSFC Budget Procedure.

   Guidelines received to date, and the locally established guidelines, are being reviewed today with Dr. Rees, Mr. Weidner, Dr. Rudolph, and others, and we will issue the budget call to the MSFC elements today.

3. OMSF PROGRAM SCHEDULE SUBMISSION - SEPTEMBER - Another related major current effort is the monthly schedule submission, which is due to reach OMSF on September 23.

NOTES 9-3-63 MRAZEK

1. REFERENCE NOTES 8-26-63 MRAZEK, PARAGRAPHS 6 AND 7: Instant Nova will have a cluster of four S-IC's and S-II's. Saturn V Junior outboard engines will not be dropped.

2. DOUGLAS AIRCRAFT COMPANY (DAC) TO QUALIFY AN/MS FITTINGS: DAC will use AN/MS fittings, against MSFC directives, and try to qualify them to 3,600 psi. DAC feels they are not obligated to furnish MC fittings.

3. S-IC STRUCTURAL TESTING: At the request of Michoud, a team of Structures Branch personnel visited Michoud to review the facilities equipment requested by The Boeing Company in support of structural testing at Michoud. The findings of this team are, briefly, as follow:

a. The plans presented indicated a considerable duplication of test equipment presently existing, or planned, at Huntsville.

b. The equipment plans are not supported by specific testing requirements, but are justified only in very generalized statements.

c. The equipment is being purchased as facility items.

d. Items of equipment are duplicated within facilities at Michoud; i.e., materials test equipment and machine shops are shown in (1) structural test area, (2) quality control area, and (3) materials test area.

e. The lack of ability to properly justify the requirements was emphasized by Boeing's failure to attend the meeting after being specifically invited.

This type of planning is being conducted at Boeing-Michoud with apparent disregard for detailed test planning being conducted at Huntsville among Structures Branch, Saturn Systems Office, and The Boeing Company. (A technical work statement has been prepared and submitted to Saturn Systems Office.)

A review of Boeing coordination sheets indicates that they have undertaken some developmental test programs that have not received approval by Structures Branch.

The Structures Branch is preparing a memorandum to Michoud, M-MICH-P, (through Vehicle Systems Integration Office) disapproving the Boeing equipment requirements noted above. A memorandum will also be forwarded through the Vehicle Systems Integration Office requesting that Boeing be directed to submit all structural test plans for approval by MSFC prior to implementation. Other cognizant divisions should be informed of the duplications noted in subparagraph d.

4. NUCLEAR LUNAR LOGISTICS SYSTEMS: Lockheed will present the results of the Nuclear Lunar Logistics Systems (NLLS) study at MSFC (your conference room) on 10-10-63 at 9:30 a.m. Key MSFC personnel are invited to attend since this will be the final review of the NLLS study. The same presentation is scheduled to be given to Dr. Shea in Washington the following day at his request.

5. DAC QUALIFICATION OF MECHANICAL COMPONENTS: Considerable effort was expended to determine the status of the S-IV-5 Qualification Test Program. The figures mutually (DAC-MSFC) agreed upon are: Total tests required - 787; tests completed - 297; tests deferred until after S-IV-5 - 222; total number of components involved in tests - 75; qualified components as of 8-30-63 - 21.

DAC agreed to report the progress of tests on a simple form sheet. These form sheets show only two components completely qualified. DAC will improve the reporting.

We have but one alternative--to waive certain tests prior to launching. I am in constant contact with Ted Gordon.

Attachment #1: NOTES 8-26-63 MRAZEK

NOTES 9-3-63 RUDOLPH

B 9/5

HR

1. My transfer from OMSF to MSFC was effective as of 25 August 63.

   Sure glad to be back again. Glad to have you back. You won't have a dull moment!

   B

2. Organizing the "Industrial Operations"

   I am presently assisting Eberhard Rees in organizing the "Industrial" Operations and also keeping in touch with Hans Maus in his overall MSFC realignment activities.

   → Suggest you have a good talk with Jerry McCall on what we should do in the IO area. I'll be glad to fill you in, too.

   B

NOTES-9-3-63-SHEPHERD

B917

MTF Planning Board: (Reference Notes 8-26-63-SHEPHERD, copy attached) It was decided at the MTF Planning Board meeting on August 29, that the MTF Working Group would develop the frame work of a plan to cover the Marshall participation at the MTF site during the construction phase. This plan will be presented to the MTF Planning Board at the next scheduled meeting of September 26. Included in the plan will be a method whereby change orders will be evaluated in terms of schedule impact, cost, and technical necessity, and a determination as to whether or not to proceed with the change. I will send you an evaluation of our planned action after the meeting on September 26.

Funds for S-II Facilities - West Coast - On August 30, Dr. Seamans approved the letter of notification to Congress for $9M increase in S-II facilities on the West Coast. (This does not include money needed for the S-II Static Test Stand at Mississippi Test Facility.) Only $5.8M has actually been allocated to date; however, this is more than enough to permit BuDocks to proceed with advertising and award of the Paint and Packaging Facility and the Structural Static Test Tower at Seal Beach.

Lease of Buffer Zone Vicinity Santa Susana: Mr. Cockrum has sold his ranch to a Mr. Hunt. Title is not to pass until Jan. 1, 1964. In the interim, both Hunt and Cockrum are participating in negotiations with Colonel Peacock. Mr. Hunt has agreed to a 5-year lease, to be signed now, to become effective on Jan. 1, 1965 for the 400 acres involved. Final price has not been settled but is expected to amount to between $500 and $1000 per month for the entire 400 acres. Even at the top price ($1000/month) this would provide use of the land, as desired, for 5 years at a total cost of $60,000.

Funds For J-2 Engine Facilities - On August 30, Dr. Seamans approved a letter of notification to Congress providing for an additional $755,000 for modifications to the J-2 test Stands (VTS-3) at Santa Susana.

Attachment 1, NOTES-8-26-63-SHEPHERD

NOTES 9-3-63 Stuhlinger B 9/7

1. METEOROID MEASUREMENT PROJECT: A status review was held as scheduled at Fairchild, Hagerstown, Maryland, on August 28. In general, it appears that the program is in reasonably good shape. The contractor is beginning to get hardware deliveries in some of the critical areas. So far, all units submitted for test have been acceptable. The schedule is currently showing a four and one-half week slippage on Fairchild-planned first flight capsule delivery date; this puts it almost exactly on the contract required date.

The only major problem is still the one with the detector panels in a radiation environment; however, a technical group meeting after the review session concluded that there is a good chance for solution of the problem within the present time schedule of the project.

2. TECHNOLOGY UTILIZATION: The first innovation reports are being received from contractors under the "Reporting of New Technology Clause." Of interest is the fact that no company to date has reported in sufficient detail for the purposes of the program. This indicates that considerable effort will be required to receive more than token compliance by industry to the clause. Mr. James Dennison, Special Assistant to Dr. Simpson, NASA Headquarters, will assist Mr. Thompson, RPD, in obtaining better compliance.

Over 11,000 copies of the MSFC booklet "Welding Tips" have been requested from Headquarters. This is one copy each 3 minutes working time since it was released for distribution.

3. ADVANCED EDUCATION: Mr. E. W. Urban of our Nuclear and Plasma Physics Branch has recently received his Master of Science Degree in physics from the University of Alabama. His thesis topic was "Charged Particle Motion in Axially Symmetric Magnetic Fields," a subject which is closely related to our charged particle studies. Congrats B

September 9, 1963

Seamans

NOTES TO MUELLER 9-10-63 DEBUS

1. SA-5. The S-I-5 and IU-5 have been erected on Pad 37B, utilizing the S-IV spacer. All major electrical and mechanical modifications to date have been completed and pre-launch checkout will begin next week.

2. Complex 37. "Pre-Power on" checks progressing. These include umbilical arms, crossover boxes, umbilical junction boxes and Automatic Ground Control Station (AGCS) terminal distributors. Approximately 70 Engineering Orders (EO's) have been incorporated in the GSE since the Ground Equipment Test Set (GETS) test. All known EO's have been accomplished.

3. Propellant Management Service Contract (Pad A). The procurement plan for this contract was signed by Dr. Seamans on 29 August.

4. Modification to High Pressure Lines. (*). Additional problems with welding of bi-metallic high pressure line has necessitated replacement of the expansion loops in the line between the converter compressor facility and Complex 37 initiated last week.

5. Environmental Control System. The installation of this system at LC 34 has been completed and checked out satisfactorily; it is now operational. There were no major difficulties. New environmental control and GN_2 purge requirements for Saturn SA-9 and subsequent vehicle instrument units necessitate a design modification which is now in progress.

6. LC 39 Pad A and Crawlerway. (*). 100 percent review of design drawings in progress. Presentation is placed on agenda of Management Council for September.

7. Data Transmission System for LC 39. Proposal evaluation and subcontract negotiations by General Electric Company are complete. On August 30, a recommended subcontract was submitted to LOC for review and approval.

8. Base Communications Operation and Maintenance Contract. (*). These proposals are due in September 11. Technical and business committees are being appointed for evaluation of these proposals commencing September 12. Fifteen days have been allowed for this evaluation with the contract date still October 15.

* Follow-on item in notes.

9. Foundations for VAB (*). Contract NASA-10. Driving of piling continues, 20 percent of piles driven; capping of piling started 3 Sep, 2 concrete pours made; contractor continues to work two 11-hour shifts, 7 days per week.

10. Saturn V Propellant Dispersion System (Destruct System) (*). A new set of ground rules for the Saturn V propellant dispersion system, dated August 2, has been received. Linear shaped charges are described therein as the explosive charges to be employed. LOC requirements for accessibility and operating procedures appear to have been met. Studies on more novel type destruct methods continue.

11. General Electric, Apollo Support Division, Industrial Security Inspection. An inspection of the General Electric Company facility at Daytona Beach was completed August 27, 1963, by the representatives of the Office of the Inspector of Naval Material (INSMAT), Atlanta, Georgia. Rating was "satisfactory. "

12. Mercury Control Center Addition (*). Final inspection held 4 September 1963, contract 1437.

13. NASA Headquarters Inspection. September 16, a survey team from the NASA Headquarters Personnel Division will visit LOC for two weeks to evaluate our personnel management program.

14. Cost of Leased Office Space. Our present rates for leased space are:

Holiday Inn Offices:	11,096 sq. ft. @ $4.64/sq. ft.
Apollo Building:	41,046 sq. ft. @ $4.26/sq. ft.

Our composite rate at the Canaveral Administration Complex (CAC) and Kabboord Building prior to leaving was $5.15/sq. ft.

B 9/9

NOTES 9/9/63 CONSTAN

1. S-IC QUARTERLY REVIEW

The dates of October 3 & 4, 1963 have been established for the next S-IC Quarterly Technical Progress Review covering the period June, July, and August. The review will be held in the auditorium of building 4200 at MSFC. ✓

2. BUILDING CEREMONY

A brief "topping of the steel" ceremony will be held the first of this week signifying the completion of steel erection on the Vertical Assembly, Hydrostatic Test and Cleaning Facility at Michoud. As the last steel member is hoisted into place on the tower - probably Tuesday - a flag will be raised atop the building. This ceremony is recognized and conducted by most building contractors.

If they can hold it Wednesday I could attend

B

B 2/3

NOTES 9/9/63 DAVIS

* Pregnant Guppy Aircraft: Contract was entered into on
gsm September 6, 1963, with Aero Spacelines, Inc., to furnish transportation for the S-IV Stage, Saturn, and other priority cargo, for the period September 1963, through June 1964. Total estimated contract cost is $995,884.00. ✓

NOTES 9-9-63 FORTUNE B 2/3 WHAT?

1. Community Development Planning Problems: Mr. Yerger, HHFA Representative, and B. U. Jones report that local communities are greatly concerned over unexplained delays in Washington approval of their applications for urban planning grants, accelerated public works projects and related submissions. The Mississippi Agricultural and Industrial Board is the legal coordinating state agency for these. Because of statewide failure to get satisfactory answers to follow-up requests, they propose to initiate court action to force release by Federal Officials. This would tie up action on all indefinitely, so we have persuaded the Chairman to defer this temporarily, in hopes that Cal Towne and others in NASA Headquarters plus Senator Stennis, who has been in close touch with local officials, can expedite some approvals. All applications apparently receive scrutiny at White House level. HHFA personnel in the Louisiana-Texas Region have informed Yerger that theirs are not being held up so this implies political considerations. Dick Callahan, Special Assistant to Mr. Webb, called me Thursday, indicating they were working on it and possibly as a help to us, the Bay St. Louis Public Works application might be o.k.'d in the near future.

2. Meeting of MTO Managers: Wednesday, I met with the MTO Managers of Boeing, North American Aviation and General Electric. The Stage Contractor representatives were very pleased to be invited and to be briefed on present plans, progress, proposed operating procedures, etc. Colonel Roberts from Mobile joined us part-time, contributing to the discussions. John Cully of Boeing pointed out that the construction schedule shown him by Roberts indicated a possible difference of up to 6 months with the Plan V schedule which Cully has been working under to date. He stated that if the S-IC facilities are not to be ready until the first of December, 1965, as shown on the MDE Pert Chart, he can slip his activation buildup here equivalently. I am bringing this to the attention of the Saturn V Project Office and the Static Firing Working Group. The three contractor heads all voiced concern over the likely availability of skilled electronic personnel in the area and wondered how training programs might be set up, now! Neither Cully nor Cox had seen the Lab & Engineering Building office arrangements, or furniture list for Boeing and North American Aviation personnel, so I agreed to send them copies before our next meeting.

Karl Heimburg — What do you suggest? B

3. Rapid Growth of Personnel at MTO: There are some 500 people working at MTO, as follows: Construction 385, Corps of Engineers 55; GE 30 and NASA 30. Colonel Roberts told us Wednesday there would be over 1,000 construction employees by the end of the month.

4. Road Maintenance: It has been my understanding that the Corps of Engineers would maintain present roads in the Mississippi Test Facility until new ones were finished. The thin-skinned macadam roads which service our temporary office locations have been broken badly in several places by heavy construction trucks of unidentified ownership. MDE indicated they had no money for road maintenance. They could not charge it to any one contractor, nor could they spread it on change order basis to several contractors without continuing difficulty. We had fortunately set aside $100,000 for this contingency and can modify General Electric's contract to sub-contract on a job by job purchase order basis.

B F Sounds good to me B

CONFIDENTIAL

NOTES 9/9/63 GEISSLER B 9/9

1. Saturn V EDS Study: Preliminary results from the Saturn V emergency detection system study indicated that a rate gyro sensor alone will not provide adequate warning to satisfy abort requirements for all failure modes. An angle of attack sensor and rate gyro sensor should be included in the warning system as a minimum necessity. A better system is realized, for slow divergence cases, if the angle of attack and the attitude angle are monitored simultaneously. Most of these slow divergence cases will provide enough warning time for manual abort. However, the rate gyro sensor should initiate an automatic abort and take precedence over the manual abort since the fast divergence cases have very brief warning periods.

2. Saturn Base Heating Tests: The attached 3 pages from the August 19, 1963 issue of Missiles and Rockets provide some insight into several of our base heating programs being conducted at Cornell Aero. Labs. The Aerodynamics Department of Georgia Tech is planning to set up a short duration base-heating facility and will do some limited research in the field of base flow. AEDC is also considering entering this field. When these two organizations become active in base heating work, we can be more selective in obtaining necessary services.

3. 6th Flight Mechanics, Dynamics and Control Panel Meeting: This panel met at MSC on 20-21 August 1963. Tentative action items are attached. After approval by co-chairmen from MSC and MSFC, they will become final.

Put in TWX

WHEN ENCLOSURES ~~ARE~~ IS WITHDRAWN, THE CLASSIFICATION OF THIS DOCUMENT IS DOWNGRADED TO UNCLASSIFIED.

CONFIDENTIAL

NOTES 9-9-63 GRAU

1. S-I-5 ELECTROMAGNETIC COMPATIBILITY TESTS: Coordination with LO-I has resulted in plans being formulated for this Laboratory's participation in the EMC tests of S-I-5 at the launch site.

2. S-I-6 POST-STATIC CHECKOUT: Final electrical checkout of the S-I-6 continues with satisfactory results in checkout station B of Building 4708.

3. S-IU-6 FINAL CHECKOUT: Minor leaks in the air bearing air supply system of S-IU-6 have been reworked and final checkout is progressing satisfactorily.

*4. S-IV-5 CHECKOUT AT SACTO: As of September 6, 1963, all of the subsystems tests on S-IV-5 have been accomplished. Clean-up work is to follow with checkout completion expected by September 10-12. Limited Electromagnetic Compatibility Tests of S-IV-5 at the launch site appear to be feasible.

5. PROPOSED RELIABILITY/QUALITY/MAINTAINABILITY STUDY: A proposal for a R/Q/M value engineering study for NASA by Kollsman Instrument Corporation was discussed with Mr. Koppenhaver during his recent visit. The study will attempt to develop a management tool with which to optimize NASA's return on its R/Q/M investment, to relate dollar costs versus results. This will be discussed further with Mr. Koelle to formulate a Center input for a possible headquarters contract.

6. MICROMETEOROID MEASUREMENT CAPSULE PROGRAM REVIEW: Representatives from this Laboratory attended the fourth Micrometeoroid Measurement Capsule Program Review Meeting at Fairchild Stratos Corporation, Hagerstown, Maryland. Their quality program is, in general, progressing satisfactorily.

7. REPRESENTATIVES FOR CONTRACT REVIEW: With the placement of a representative in P&VE Laboratory, we now have contract review for quality requirements in all laboratories.

NOTES 9-9-63 GRUENE

B 9/9

H.S. — Must decision was made about a year ago, if I remember correctly. I'm surprised that you were unaware of it! B

1. Saturn I, Block II Ground Wind Loading: The ground wind conditions design criteria were changed for Block II vehicles. Wind limitations are now one half of what the original design criteria called for. This has considerable consequences for the vehicle preparation and operations on the firing day. We are in contact with P&VE and Astrionics Laboratories. They are checking into this matter to see what steps have to be taken for the firing preparations, because if we experience winds above 16 knots at the 10 foot level, we have to pressurize the RP-1 tanks to 5 psi.

2. SA-5: The S-I-5 and IU-5 have been erected on Pad 37B, utilizing the S-IV spacer. All major electrical and mechanical modifications to date have been completed and "pre-power-on" checks are in progress.

3. SA-5 Schedule: A firm schedule for SA-5 does not exist because of the questionable DAC modification period. DAC has promised a meeting with LVO this week to discuss the AMR modification schedule, which will become a factor in firming the overall SA-5 schedule.

B 9/9

NOTES 9/9/63 HAEUSSERMANN

1. RCA-110 SYSTEMS FOR SATURN V: An agreement was reached between Low's and Shea's representatives and L. Richard (and Kroeger) that they, with Bellcomm Corp., will perform a study of the Saturn V's RCA-110 system (to be finished 9/1). Bellcomm, accompanied by Sperry (Freitag's office), visited L. Richard last Friday and left the impression that you had agreed with Shea on a time delay for the report. The purpose of the Bellcomm visit was to give us a preliminary briefing of what would be presented to Shea. Bellcomm's estimate of Saturn V equipment requirements is based on their limited knowledge of the job to be done. They recommend a larger system in the Launch Control Center (LCC) that is in our present plan. They believe that the computer system on the Launcher Umbilical Tower (LUT) will be adequate (their concern is the total amount of equipment in the pad area). To dispel Bellcomm's lack of system knowledge, we will conduct a joint investigation where Bellcomm presents a sophisticated alternate to our solution of the problem; so far, they have given only criticism. We will then compare their system with the existing one, based on system capability, system expansion, reliability, cost and schedule.

Nue ??? B

We estimate that the Bellcomm system will cost $2 million more per station, perhaps totalling $20 million. They are not interested in the funding side of the picture. This additional money would be devoted to the technical contingency, since we feel the present RCA-110 system will do the job.

Bellcomm agreed that we should release immediately the paperwork to procure the Saturn V's 110 system as we had originally planned, so that the study could be made parallel to the procurement action. Should a decision against the 110 system subsequently be made, the program could be stopped just prior to final sign-off.

W.H.

In view of all the discussions on the RCA-110 system, we would like to have a short conference with you to fill you in on the details.

not too short!

O.K. Please lay on with Boeing. Let's allow at least 1 hr so I have a chance to understand the problem. B

2. STL STUDY OF SATURN IB/CENTAUR FOR VOYAGER APPLICATION: MSFC selected STL to conduct this study because they had a contract with LeRC at the time for analysis of the Centaur Guidance System and thus would be in a good position to make use of realistic performance and reliability data in the Voyager application study. LeRC has, however, directed STL to: (1) Assume that the system works reliably, (2) Assume that it performs to GD/A SPECS! These instructions were given to STL at the time STL had reported to LeRC that the Centaur guidance was very sick. They quoted low performance and reliability numbers and recommended such things as changing out gyros and accelerometers. (We said the same thing some time ago.) Because of the directions from LeRC, STL is forced to use unrealistic data which severely dilutes the value of the Voyager applications study. You may be able to set things straight by asking Cortwright (since both studies are under OSS auspices) to get LeRC to permit STL to use the results of their Centaur guidance analysis in the Voyager applications study.

H. Hueter for info! B

Let's discuss this also with our MSFC Contract Supervisor of the STL study contract also in attendance! Ditto H. Hueter B

NOTES 9/9/63 HEIMBURG

B 9/9

1. S-I-7:

S-I-7 was installed in the test stand Friday, 9/6/63. Short duration firing scheduled 10/1/63. ✓

2. F-1 ENGINE TEST STAND (WEST SIDE OF TOWER):

The inhouse work is progressing on schedule to meet an initial test date of 11/15/63. The lox and fuel run tanks will be completed by Chicago Bridge and Iron Company this week. The upper lox and fuel suction lines have been received and are being inspected by Quality and Reliability Assurance Laboratory. ✓

3. S-IV STRATIFICATION TEST PROGRAM:

S-IV stratification test stand buildup is presently on schedule. Inspection of the bulkhead and insulation in the tank is in progress to determine the effect of the Guppy flight on these items. ✓

↓

K.H.

Please lay on a ½ hr briefing for me on implementation, instrumentation etc of this stratification test program

B

B 9/9

NOTES 9-9-63 HOELZER

No report.

The automatic computers now completely in charge?
JCM

NOTES 9-9-63 HUETER B 9/9

1. ALSS: A status report on the Apollo Logistics Support System (ALSS) is being prepared for submission to OMSF. This approach is being taken in view of the outcome of the Management Council Meeting on August 27, wherein the agenda item on ALSS was not discussed.

As a result of the decision to eliminate the Special Assignments Office, discussions are being carried on with the Aero-Astrodynamics Laboratory and the Propulsion & Vehicle Engineering Laboratory relative to the phasing in of the payload functions, including organizational arrangement of the groups. Effort is continuing to develop and submit a realistic ALSS development and test schedule to OMSF.

H.H. Please keep me posted on progress and reactions you get B

2. SATURN 1B/CENTAUR/VOYAGER STUDY: We have received a draft of the Saturn 1B/Centaur/Voyager Study Report, which is being reviewed, and a meeting of MSFC people is scheduled for September 11 to discuss this report. A meeting will be held at STL on September 13 to discuss the MSFC comments with STL.

H.H. See Haüsser-Mamms NOTES 9-9-63 par. 2. B

3. S-VI STUDY: From preliminary studies, it appears that full velocity reentry test of the Apollo can be accomplished with the S-1B/S-VI with two burns of the S-VI. This is being studied further.

Mr. Salmanson, from OSS, was here last week to prepare for a presentation on September 9 to Mr. Newell on the status of S-VI and Centaur.

NOTES 9-9-63 Koelle B 9/9

1. SPACE STATION

Last week we had a preliminary review with P&VE Laboratory on their in-house study on the space station project. Their project engineer is Mr. Cash. Our project engineers are Jim Carter and Lou Ball.

This effort was initiated upon your request approximately four months ago. The reasons for this study are as follows:

a. To study compatibility of space station concepts with SATURN launch vehicles.

b. To consolidate briefing material for you in preparation of a pending decision on this project in the Management Council Meeting in the next few months.

c. To study the possible workload on MSFC, resulting from the initiation of a space station project, assuming various degrees of participation.

d. To see if there are any concepts which look attractive to us and which have not been studied at other places.

The three-hour review brought out that a spinning space station (3-man, 4-month) is marginal even if 2 SATURN IB's are used. There is a preference for a space station transported by a SATURN V into orbit, which can house 6 people, has a growth to 12, can spin and despin and is supplied by a six-man APOLLO spacecraft. This solution is non-marginal, as far as weight is concerned, and permits quite some leeway in solving development problems by adding weight.

P&VE has done an outstanding job on this study and we are planning to give you a somewhat more polished presentation within the next 8 weeks or whenever the subject should become a hot issue. ✓

We also discussed this subject and recoverable boosters for a full day with Dr. Yarymovych from OMSF, who is now in charge of these studies within Dr. Shea's office. We believe we have established good and effective relations with his office, which is planned to be staffed by about 25 people in the following organizational breakdown:

Manned Satellite Studies

a. Mission Definition (Dr. L. Werner)
b. Operations and Logistics (J. Crenshaw)
c. MOL Systems (M. Schnitzer)
d. MOL Subsystems (?)
e. Program Coordination (?)

Each of these subgroups will have about five people. ✓

H.H.K.

Keep this hot! There are growing indications that NASA Hq (top Trinity) is far more excited about a manned orbital Lab [Space Station] as next step after Apollo, than about manned planetary expeditions. And for good reasons. They think we have to know more about long stay times in space, — and support is easier to get!

NOTES 9-9-63 KUERS B 9-10

1. Saturn V, S-IC Stage:

a. We detected that our heat treat fixtures for the gore segments are not in conformance with the master gages which control the contour of the bulkheads. Differences of more than .100" were found. Unfortunately this was not discovered by Boeing inspection or our Quality Control. As a consequence the gores do not fit properly on our Meridian Welder making the welding on this fixture an extremely difficult task. The heat treat fixtures are now being reworked by Boeing Wichita personnel here in a three shift operation.

b. Progress on the lower fuel bulkhead was therefore slower than anticipated. We still succeeded in welding 6 gores together accomplishing good quality welds with only a few minor repairs.

c. Ring baffle installation is held up because of lack of parts manufactured in Seattle.

d. Further delay is imminent for delivery of Lox Tunnels from Seattle because of unacceptable weld quality of these parts. We are sending our welding engineer next week to Seattle to help Boeing in solving the welding problem.

2. Resume of Manufacturing Engineering Working Group Activities during August 1963:

S-II: Seven meetings were held mainly for discussion of tooling and possible problem areas in manufacturing of the Strip Seal Bulkhead Design. Also installation techniques for insulation of LH_2 container and other S-II tooling and processing techniques were reviewed.

S-IV: Six splinter meetings were held to discuss the following subjects: MSFC production control system; scheduling of remaining installation and modification of S-IV-5; and S-IV man-rating program.

RIFT: Two meetings were held with Lockheed personnel for review of tooling concepts and 2319 weld wire specification.

S-IVB: We had our second S-IVB Manufacturing Engineering Working Group Meeting at Los Angeles where a complete status of tooling and manufacturing was presented by DAC with subsequent discussions of problem areas. Also a summary of all splinter group meetings and their results and recommendations was reviewed.

NOTES 9-9-63 LANGE

B 9/10

1. SATURN I/IB: SA-5 - The S-I Stage and the IU have been erected at AMR and work is proceeding satisfactorily. Post static-firing checkout of the S-IV stage at MACTO has been proceeding ahead of schedule. The estimated shipping date to AMR is now 9-20-63 rather than 9-27-63.

S-IV - The second MSFC/DAC meeting to consider the 9-week program definition phase of the more comprehensive S-IV reliability effort is scheduled at DAC during the week of September 8.

* S-IVB/IB - DAC has signed the contract modification. Total cost is $53.5 M including fee for limited development effort and delivery of 4 R&D flight stages. The contract is to be handcarried to Headquarters on 9-10-63 for approval.

2. SATURN V: S-II - The forward and aft mockup sections due to be delivered to MSFC on 10-15-63 are progressing on schedule and are now approximately 90% complete.

Substantial progress has been made in the last 2 weeks on the battleship tank installation by Pittsburg Des Moines-Moline and it appears that they will accomplish the beneficial occupancy date of 10-21-63 so that NAA can start installing systems.

The bulkhead fabrication building is now approximately 99% complete, and it is anticipated that the completion date will be 9-30-63. Delays have been incurred in the area of the process piping system which includes solenoid lockouts, insulation of piping, etc.

The Seal Beach service building scheduled for completion by 9-13-63 is approximately 93% complete with work progressing satisfactorily.

The water conditioning facility at Seal Beach is expected to be complete 9-28-63. All underground piping has been completed and yard paving is in process.

3. APOLLO: Panel Review Board (PRB) Secretariat met at MSFC and settled PRB Charter, Repository procedures, scope of new "Documentation Panel," and agenda for next PRB meeting, September 25.

SATURN IB flight missions to be proposed by MSC will be one 14-day mission (without LEM) and 3 rendezvous training and stage firing missions (with LEM and S/C). This appears compatible with dynamic test schedule.

Preliminary EDS Specs for SATURN IB and V based on failure mode analysis have been developed by a joint MSC-MSFC Ad Hoc group.

"Awareness Program" has been accepted by MSC for participation.

B 9-10

NOTES 9-9-63 MAUS

1. FY 65 BUDGET SUBMISSION - On September 3, we reviewed our plan for the FY 65 Budget effort with Dr. Rees and obtained his concurrence. Dr. Rees then reviewed this proposal with Bob Freitag last Friday. Freitag agreed, and we are proceeding accordingly. The basic approach is as follows:

   a. Minimize the September 16, 1963, submission and limit the effort essentially to input from the Project Offices, and the Validation Data. ✓

   b. Limit the September 16, 1963, submission to FY 64 and FY 65 estimates at the stage level. This is a deviation from OMSF's request for estimates through run-out with detail down to all contracts over 1/2 million dollars. ✓

   c. The final FY 65 Budget Submission in November will be prepared with detailed inputs from the Project Offices, laboratories, and contractors, and will include program run-out cost estimates to the major contract level (1/2 million and over). ✓

2. BUDGET IMPACT STATEMENTS - In addition to the basic FY 65 budget submission we have been requested to make a broad program impact analysis for the following two cases.

   a. Original OMSF guidelines imposed on FY 64 ceiling based on the Senate version of the authorization bill with an assumed $50 million cut to cover House-Senate compromises. Latest request is to impact an additional $50 million cut assuming appropriations are less than authorizations. ✓

   b. OMSF guidelines include a ceiling for FY 65 based on preliminary NASA - Bureau of the Budget deliberations. OMSF has requested that program impact be assessed on the assumption that the FY 65 guideline ceiling is firm. ✓

B 9-10

NOTES 9-9-63 MRAZEK

1. NASA/NAVY AGREEMENTS: The overall agreement was signed by the Navy on 9-5-63. This completes Navy approval of the overall agreement, relocation agreement, host-tenant agreement, and construction agreement. NASA Headquarters signatures are expected momentarily on the overall agreement and the relocation agreement, thus completing the transaction for the use of the Moffett Field facilities.

2. KIWI B-2 COLD-FLOW TESTING: Post-mortem examination indicated approximately 50 unfueled graphite modules had developed longitudinal cracks. This is the first incident of this failure mode. Causes for failure are still undetermined. Significant, however, was the fact that all modules remained in place and nothing was voided through the nozzle. Post mortem is continuing.

3. LOX PUMP EXPLODES ON F-1 ENGINE 012: The LOX pump on Engine 012, which has accumulated 1,843 seconds of test time, exploded during the 29th test on 8-29-63. This turbopump is of the same configuration as pump E027 which exploded during component testing and which had accumulated 2,000 seconds. I saw both pumps. There is a similarity in the effects of the explosion.

Engine 012 received damage to instrumentation and control lines. The cause of the explosion is not known at this time, but the deep back-rib impeller and invar-composite seal are the principal suspects. All engine system and turbopump testing has been suspended pending completion of an investigation of the explosion. Estimated downtime for repairs to Stand 1B-1 is four weeks and Stand 1B-2 is one week.

4. S-II LH_2 TANK INSULATION INADEQUATE: The current .8-inch S-II LH_2 tank insulation for vehicles through S-II-03 is not adequate to maintain the design heat leak of 128,000 BTU/mission. North American Aviation, Inc. (Space and Information Division) and this laboratory are investigating possible insulation retrofit schemes, such as additional foam applied over the existing insulation, for these vehicles so that the design heat leak can be met.

5. HANDLING INCIDENT ON H-1 ENGINE: (Reference NOTES 8-26-63 MRAZEK, paragraph 4.) The H-1 engine fell from the transporter when a lock pin was not properly inserted in engine support plate and transporter. (See attachment #2.)

6. RL10 ENGINE: The follow-on R&D procurement plan has been returned from NASA Headquarters with several modifications. Contractual action was reduced from two years to one; the cost-plus-fixed-fee type contract was changed to a cost-plus-award fee; implementation of an NPC 250-1 reliability document was required; and a new contract in lieu of a continuation or modification of contract NAS8-2690 was required. The implication of these modifications is now being evaluated.

7. VEHICLE MECHANICAL DESIGN INTEGRATION WORKING GROUP: Minutes of the third S-IC Vehicle Mechanical Design Integration Working Group meeting, which was held 6-26-63, are attached. (NOTE: Minutes are forwarded to Dr. von Braun only; copies may be obtained by calling extension 876-4340.)

8. J-2 ASSESSMENT: Status and progress of the J-2 were reviewed. The PFRT injector was selected. Again, the Isp for the first delivered engines will be lower than contractual nominal. Means were discussed to up the Isp from 922/23 seconds by three seconds.

I've pulled these for more detailed study B

Attachment #1: NOTES 8-26-63 MRAZEK
Attachment #2: Sketch
Attachment #3: Memo No. M-P&VE-VG-605

B 9/10

NOTES 9-9-63 RUDOLPH

No Notes.

Nothing happening?

JCm 9-9

NOTES-9-9-63-SHEPHERD

B 9-10

No Notes

NOTES 9-9-63 Stuhlinger

B 9-10

1. METEOROID SATELLITE: Further experiments were carried out at Ling-Temco-Vought on the effects of electron irradiation upon the meteoroid sensors. Pulses caused by electron discharges proved to be sufficiently different from pulses caused by meteoroid penetration to permit a discontinuation between wanted and unwanted pulses by electronic means. It is not likely that the modification of the electronic circuits will cause an undue delay of the project schedules.

2. ALSS PAYLOADS PROJECT: Since completing the conceptual design of shelter payloads for the Saturn V LLS system, RPL has been supporting the Special Assignments Office in connection with the thermal design of Apollo Logistic Support System Payloads and definition of lunar scientific missions. In particular, we have developed a computer program for predicting lunar shelter temperatures based on a shelter configuration established by RPL. This program prints out data on temperatures in various assumed isothermal regions within the shelter as a function of time. Sun angle, lunar surface radiation, etc., are considered. Also, parametric data concerning environmental control systems for ALSS Payloads are being generated at the request of SAO.

September 16 1963

NOTES TO MUELLER 9-17-63 DEBUS

1. SA-5.* Checkout of S-I-5 is on schedule. Facility difficulties and co-existence with the facility contractors are the most predominant items at this time. Structure elevator usage is now critical and may become intolerable when checkout activities require more personnel. Investigations are being made to determine if an "off-shift," construction contractor-operation is possible.

2. SA-5 RF and Telemetry Checkout. RF and telemetry checkout is proceeding satisfactorily, with the exception of Minitrack and TV. Some of the vehicle equipment for these systems was not installed before vehicle shipment. TV equipment is expected to arrive September 12, and Minitrack equipment will be installed during the week of October 14. If these dates are met there should be no adverse effect on the overall schedule.

3. VAB Foundations.* (As of September 9, 1963)

a. Total linear feet of piling to be driven - 674, 000
b. Driven as of 9-11-63 (approx.) - 200, 000
c. Accepted as of 9-11-63 (approx.) - 100, 000
d. Contractor now working 5-day week, two 11-hour shifts. However, second shift is not utilizing all pile-driving equipment. Four hundred fifty cubic yards of approx. 40, 000 C. Y. of concrete placed to date.
e. As of September 11, 1963, pile-driving ahead of schedule; overall contract approx. 1-1/2% ahead of schedule.

4. Status of Launcher/Umbilical Towers 1, 2, and 3. Work is progressing satisfactorily by Ingalls Iron Works Company, Birmingham, Alabama, to provide and erect the steel frame, elevators, and crane. Most of the steel and mount-mechanism (pedestal) shop-drawings have been submitted and have been reviewed by Reynolds, Smith and Hills and LOC. Contract modifications have been incorporated in the shop drawings rapidly and smoothly by the contractor who seems to be putting outstanding effort into the project. The contractor's PERT network of nearly 1, 000 events is being analyzed.

5. Delay in Complex 34 Cable Delivery. Delays in the delivery of cables ordered in the March-May time period are jeopardizing the November 16 start date for the Complex 34 wet test. The reason for these delays and methods for solving this problem are being investigated.

6. Procurement of Propellant Servicing Systems (LC 39A). * The Procurement Plan was approved by Dr. Seamans on August 29. Release of the Request for Proposals is awaiting evaluation criteria from Source Evaluation Board, which is scheduled to convene September 11. The Request for Proposals will be released on or about September 13, 1963.

7. Modification to Complex 37 High Pressure Gas Lines. * When these lines were removed for modification, considerably more liner collapse was observed than had been suspected. This will necessitate cutting several feet off the end of each section of pipe, or removing and replacing the liner, or replacing some of the pipe. This additional work plus a firmer price from Bechtel has resulted in a cost increase from $145,000 to approximately $170,000.

8. Slush Hydrogen (at temperatures of Liquid Helium). On September 4, an informal presentation was made to LOC and MSFC by representatives of Linde Corporation on the subject of "Slush Hydrogen." Results of a recent test program, conducted by the Linde Corporation for the Air Force, were discussed, and problem areas requiring further study were outlined. We are investigating the use of slush hydrogen for long term storage in space and associated ground support equipment.

9. Altitude Chambers, Contract NAS10-732. * Chicago Bridge & Iron Company's protest action is still in the hands of GAO. We have been keeping close contact with this protest. Phase I, 100% design of the Stokes Contract was completed September 10, 1963.

10. Real Property and Accountability. The Saturn Barge Canal and LC 36A have been transferred to LOC from AFMTC. Transfer documents on the Special Assembly Building (AF), the Central Shop, and portions of LC 37 have been received from Canaveral District Engineer.

11. Operation and Maintenance of JetStar, * Lockheed Aircraft Service Co. There has still been no decision or information released by GAO on the Capitol Airway's protest.

12. Martin-Marietta Studies Review. I plan to be in Denver on Tuesday to review the study contracts LOC has with them.

13. Visit of Haile Selassie. State Department is arranging a visit of His Imperial Majesty, Emperor of Ethiopia, to the NASA installations at Cape Canaveral for October 5, 6, and 7.

14. Centaur. LOC will handle all Cape Canaveral launch arrangements for press coverage in support of Lewis and Goddard.

15. Land Development - Approach to MILA. We have had the opportunity of viewing the land development plans for that area on the Florida mainland approaching the Orsino Causeway where NASA's main entrance into MILA will be. The general appearance of the area appears to be very satisfactory and conducive to an excellent approach.

16. Strike. We are concerned with the strike that developed last week. Today (September 17) should give us some indication of the course of action which may follow. The details leading up to the strike follow:

The Order of Railroad Telegraphers Union first placed pickets at the north and south entrances to MILA on September 11. This resulted in approximately 863 building trades employees not reporting for work or leaving their jobs. On the second day, approximately 1, 404 employees out of a total of 2, 546 were not on the job. Eleven contractors out of a total of 19 major contractors were affected by the picketing. The picketing was not recognized by the Brevard County Building and Construction Trades Council, and, as a result, members of the various Building Trades Unions associated with the Council were urged by their business representatives to remain on the job. In view of the picketing being unauthorized, the contractors, through the Corps of Engineers, were urged by NASA to demand that the various labor organizations supply men to proceed with the work. As a means of legal recourse, three of the contractors filed charges with the National Labor Relations Board alleging violation of the secondary boycott provision of the National Labor Relations Act. These charges are currently being processed. Pickets did not appear on Friday, September 13, at the request of the coordinator for the Building Trades Council, so that the Building Trades workers could receive their pay checks. The pickets did not appear on Monday, September 16, and the latest information is that they will probably not re-appear before Wednesday, September 18, if at all. Whether or not they will appear depends on action being taken in Washington on September 17 relative to the Florida East Coast Railroad labor dispute.

* Follow-on item


RECEIVED
SEP 19 1963
M-DIR

NOTES 9/16/63 CONSTAN B 9/16

Negative Report

B 9/16

NOTES 9/16/63 DAVIS

No notes.

NOTES 9-16-63 FORTUNE B 9/16

1. Community Development Planning: Mr. Yerger, Representative from the Regional Administrator's Office, Housing and Home Finance Agency, (HHFA), Atlanta, Ga., and B. U. Jones continue to be questioned by local officials regarding Applications for Planning Grants, plus Loans and Grants for Sewer and Water Improvements. Latest word from Cal Towne in NASA Headquarters is that apparently some Mississippi cases have been reviewed at Top Washington level, but neither approval nor disapproval has been indicated. We have persuaded the State Agricultural & Industrial Board to temporarily defer court action. Formal intercession by ML or NASA Administrator is not deemed necessary until we see how the communities fare through efforts by Senator Stennis' office. Meanwhile, we are at least having success getting all the local counties working with us on mosquito control, the latest hatch again causing sustained irritation. ✓

2. No Hunting at MTO: The Dove Season opened on the 14th but there was too much construction activity spread throughout MTO to permit public shooting. Much as I like to tramp the woods and open fields for game, I felt we should prohibit hunting for the time being. We cannot control hunters in the Buffer Zone but we hope to keep them out, particularly rifle shooters during deer season, from the Fee Area. Bow and arrow attempts by our own employees, restricted from immediate vicinity of each building site, might be considered. Too bad, I'm not so good at Bow + arrow! B

3. Boat Service: Thanks to our friends in the Test Division, we now have two Surplus Army "J" Boats for river surveillance, monitoring of dredging operations, photographic support, rescue work, etc. MTO Engineers and GE personnel supervised digging out a slip and building a boat shed downstream of the Headquarters Building. There are times when I miss having a Sailor or Marine around to paint out U. S. Army on our vehicles.

Haha!

BF Has have you manned the boats?. B

CONFIDENTIAL

B 9/16

NOTES 9/16/63 GEISSLER

1. 6th Flight Mechanics, Dynamics, and Control Panel Meeting: Re: your questions on Notes 9/6/63 Geissler, copy attached as enclosure 1. The last sentence of agreement #1 has caused some confusion and should be reworded as follows: The launch vehicle insertion accuracy is determined by the hardware errors and the guidance scheme errors. These errors have not been completely determined, however, it is felt that the combination of the hardware and guidance scheme errors will be such that the launch vehicles (Saturn I & IB) will be capable of meeting better accuracies than those specified by MSC, which are: velocity ± 35 fps, flight path angle ± .25°, altitude ± 3000 feet, and yaw angle ± .1°. ✓

Concerning your question on action item #8, the configurations of SA-504 and SA-505 are identical in shape. The term "alternate configurations" refers to the various combinations of the Saturn V propulsion stages and service module propulsion systems that might be used to come up with an acceptable flight plan to meet the reentry conditions required for testing the heat shield of the command module. The flight plans will be presented in detail at the Saturn V Performance Review Meeting scheduled for October 8, 1963 (see attached agenda - enclosure 2). The Saturn IB/S-VI configuration is definitely not considered as an alternate configuration for the report mentioned in this action item. ✓

✓ I expected that! B

2. Project LIEF: Dr. Shea questioned the use of Project LIEF (approved by OMSF) for justification of FY-65 extension of Building 4663 (COMP). Supplementary and correcting information to the MSFC CofF budget request was furnished his office by 9-11. In summary: (1) no additional space requirements for Project LIEF are anticipated, (2) COMP requires additional space to return personnel and equipment from the HIC Bldg. to Bldg. 4663. It should be understood that our proposed support for Apollo IMCC would require some additional facilities. However, they are not approved yet and should not be considered part of Project LIEF. ✓

E.B. The little trick used on the J-2 engine isn't adequate is it? Deidner is familiar with what I mean. B

3. Rift Stage Altitude Simulation Facility: Facilities Engineering Office has requested assistance in evaluating Lockheed's proposal for Rift Stage Test Stand Exhaust System. Aero-Astrodynamics Laboratory is studying the technical feasibility of the Altitude Simulation System.

4. Apollo Re-Entry: The higher performance mentioned in notes of 9/3/63 Geissler (copy attached as enclosure 3) has been confirmed to be 9,500# available for the command module at 10,925 met/sec, 96° path angle and 120 km orbital altitude. ✓ This information was given informally to Dr. Lee and Dr. Shea. Interest in the reentry question is still very much alive at OMSF. ✓ Dr. Lee is waiting impatiently for the results of the Bellcomm Study on Reentry. ✓

So am I B

↖ Ablative nozzle "barrier".

CONFIDENTIAL

WHEN ENCLOSURES ARE WITHDRAWN, THE CLASSIFICATION OF THIS DOCUMENT IS DOWNGRADED TO UNCLASSIFIED.

NOTES 9-16-63 GRAU B 9/16

1. S-I-6 POST-STATIC CHECKOUT: Instrumentation checkout is proceeding satisfactorily on S-I-6.

2. S-IU-6 FINAL CHECKOUT: Instrumentation checkout is proceeding satisfactorily on S-IU-6.

3. S-IV-5 CHECKOUT AT SACTO: It has been determined that the hydraulic system of S-IV-5 is contaminated. Personnel are being dispatched to Sacramento to determine the extent of contamination. Douglas has completed all phases of Instrumentation Systems Checkout on S-IV-5 and our laboratory is reviewing the results. We are recommending to the Saturn I/IB Manager that final buy-off on the S-IV-5 stage be accomplished after all modifications and rework have been accomplished; most likely at the time the stage is moved from the Special Assembly Building to the launch pad.

4. QUALITY PROGRESS REVIEW MEETINGS: Quality Progress Review Meetings were held with North American Aviation, the Boeing Company and Douglas Aircraft Company. Attending were representatives from the Quality and Reliability Assurance Laboratory, Saturn Systems Office, the contractors and the Resident Government Inspection Agency. The following number of action items evolved from the meetings:

PROJECT	TOTAL ACTION ITEMS	TO M-SAT	TO CONTRACTORS	TO GOV'T INSP AGENCY	TO M-QUAL
S-II	8	1.0	3.0	1.5	2.5
S-IC	4	0.0	0.0	1.5	2.5
S-IV & S-IV-B	8	2.5	1.5	0.0	4.0

Attendees generally agree that this type of informal working group meeting is productive to all concerned. An S-I meeting with Chrysler is scheduled, and subsequent meetings will be held with each contractor at approximately three (3) month intervals.

5. CHANGE IN NASA HEADQUARTERS PERSONNEL: After the sudden and unexpected resignation of Mr. Koppenhaver, Mr. John Condon who used to be Mr. Koppenhaver's assistant has been named Acting Director of the Office of Reliability and Quality Assurance in NASA Headquarters. D.F. What's your impression of the new man? Have you hit it off well with him? B

6. GOVERNMENT INSPECTION AGENCY SUPPORT: We are presently formalizing an agreement between the Tennessee Valley Authority and NASA whereby TVA will perform inspection services at Ingalls Iron Works in Birmingham and Decatur, Alabama, on Launch Operations Center Contract NAS10-716. TVA is now aboard our bandwagon.

B 9/16

NOTES 9-16-63 GRUENE

1. SA-5 Schedule: We were not able to work out more details to establish a firm firing date. I sent Mr. Moser to Sacramento last week and I hope our preliminary schedule can be firmed up now. ✓

2. Chrysler Meeting: I had a meeting with Messrs Lowrey and Yount of Chrysler to discuss their mission and support assignment. Mr. Cooper of M-SAT attended. A modified scope of work proposal was sent to Col James' office and I hope the Chrysler contract can be firmed up soon. ✓

3. Wind Limitations: The wind limitations on Saturn I, Block II vehicles as mentioned last week in my Notes concerning on pad preparations only were not known to us nor to Astrionics. Modifications in the electrical networks seem mandatory and are now being worked out between P&VE, Astrionics, and LVO. (Please do not include this item in TWX to Dr. Mueller.)

→ H.F.

— Does this affect SA-5?
— Was goofed here? How can recurrence be avoided?
— Why do wind limitations lead to network changes? Because of pressurization needs?

B 9/16

NOTES 9-16-63 HAEUSSERMANN B 9/16

NO NOTES

NOTES 9/16/63 HEIMBURG B 9/16

1. MTF WORKING GROUP:

Louisiana State Highway Department has instructed their Consulting Engineer to proceed with design of the 73-foot high Interstate-10 Highway Bridge over East Pearl River. Meanwhile, Government Accounting Office is reviewing the basis on which the high-level bridge was required instead of a less-costly, low-level bascule bridge. We are resolving this matter with NASA Headquarters, and will keep you advised. ✓

Aetron Contract NAS8-5576 MTF Phase I Technical Systems: First increment design (60-day review) has been received, reviewed, and returned to contractor. ✓

2. HOLDDOWN ARM ACTUATOR TEST (S-IC TEST TOWER):

The Philadelphia Gear Corporation's roll ramp actuator is to be used for the four holddown positions on the S-IC Static Test Stand. Each actuator is comprised of four basic "roll-ramp" units. One of these units is now being load-tested by Test Laboratory at the old Launching & Handling Fueling Test Stand (4350 Area), north of building 4481. Static loads in increments of 250 kips up to 3,000 kips have been applied. The unit is now being dynamically tested with vibrating loads varying from about 800 kips to 1,700 kips at 7.5 c.p.s. Some 45 hours of this dynamic test have been completed. A dynamic test time of 100 hours is planned to establish a minimum life of the unit.

In the same area, the single arm test structure has been completed. This will be used to load test a complete holddown arm for the S-IC, along with the complete roll ramp actuator. The first of the holddown arms has arrived and is now being installed in the test fixture. ✓

K.H.

I would like to see that thing occasionally B

NOTES 9-16-63 HOELZER

1. DATA REDUCTION STUDY RELATIVE TO STAGE CONTRACTORS: A study of data reduction requirements of the various stage contractors (S-I, S-IC, S-II, S-IVB, F-1) has been completed. Recommendations have been made to Saturn Systems Office and a report containing all information concerning the study, along with recommendations, is being published. Saturn Systems Office has concurred in the recommendations and has notified all contractors. Essentially, the recommendations are that Douglas should establish data reduction facilities at Sacramento and at Huntington Beach. North American will establish facilities in Downey and it is expected that flight evaluation, as well as static test evaluation, will be done there. A central data reduction facility to serve Chrysler and Boeing, and to back up the facility at MTO, is to be established at Slidell. This division has been directed by Saturn Systems Office to proceed with planning and implementing the facility at Slidell. This is to be done over the next year.

2. VISIT BY BELL COMM OFFICIAL: Dr. Anthony Oettinger, mathematician and computer expert from Bell Comm, is to visit this division September 17 and 18. His purpose is to become acquainted with computational techniques and capabilities existing at MSFC. The visit has been coordinated with Mr. Dannenberg.

NOTES 9-16-63 HUETER B 9/16

1. SATURN-IB/CENTAUR/VOYAGER STUDY: A meeting was held at STL on September 13 to discuss the draft of Centaur Final Report. Compatibility of Centaur's multi-point ground system with that of the Saturn single-point ground system was brought up. STL admitted that they were deficient in not covering this area in the report, and will do so, to every degree possible, in the remaining amount of time. The consequences of a more severe vibration criteria over that of the Atlas Centaur vehicle was not covered adequately and STL will cover the impact of this to greater detail for the Final Report.

The following schedule of events has been changed tentatively to the following dates, and an additional event included:

a. Presentation of Centaur Study to Dr. von Braun, changed from September 30 to October 2. ✓

b. Presentation of Comparison of Centaur with S-VI as a third stage on Saturn - October 3. ✓

c. Presentation of Centaur Study to NASA Headquarters, changed from October 4 to October 10.

Bonnie
I have listed this for October 7. Please clarify!
B

2. S-VI STUDY: A preliminary review of the S-VI presentation will be held Tuesday, September 17, in Room 329, Building 4200. ✓

3. APOLLO LOGISTICS SUPPORT SYSTEM (ALLS): Activities on the Lunar Logistics effort continues. Civil Service hiring and staff planning within Special Assignments Office is at a standstill at the present time; however, Engineering Service personnel from Northrop are still being brought on board. A presentation was made to P&VE last Tuesday morning on the effort in the Shelter Payload. ✓

We have been advised by representatives from Ames that they will be unable to make a presentation to MSFC during the month of September on their effort in the Life Science area. They are unable to advise a possible date for such a presentation to MSFC at this time. ✓

Dr. von Braun.
It is Oct. 7, 9 to 12.
It was changed last week because of conflict with S-IC meeting Oct 3/4. BH 9/17

NOTES 9-16-63 Koelle

B 9/17

1. OMSF Advanced Systems Studies

We got an official communication from Dr. Mueller last week, informing us of the study projects tentatively approved by his office. These studies still have to be approved by Dr. Seamans.

The following tables are a statistical evaluation of the OMSF list:

a. Distribution According to Centers:

Center	No. of Study Projects	%	10^3 Dollars	%
LRC	1	2	3,500	15
MSFC	28	49	10,100	44
MSC	16	28	4,770	21
LOC	3	5	650	3
Headquarters	9	16	4,050	17
TOTAL	57	100	23,070	100

b. Distribution According to Areas of Activities:

	No	%	$	%
Launch Vehicles	11	19	4,850	21
Orbital Systems	16	28	6,520	28
Lunar Systems	21	37	10,000	44
Planetary Systems	9	16	1,700	7
TOTAL	57	100	23,070	100

c. Other Items of Interest:

In addition to this, there is about $3 million (at this time) held back at OMSF for further negotiation. Chances are that this money will end up somewhere else, if we do not ask for it in the near future. I am preparing such a request jointly with Mr. deFries at this time.

In addition to these OMSF funds, we can expect to obtain up to $1.5 million for systems studies from OART for 13 tentatively approved studies.

This overall picture looks relatively rosy, as we received only $8.5 million total for FY 1963, as compared to $11.6 million for FY 1964 (which might even be as high as $14.6 million). On the other hand, this increase is not excessive, as it is less percentagewise than the NASA budget increase. We also might loose some studies before Dr. Seamans signs off. The funding given above does include several large studies managed and supervised by Mr. deFries in our new mode of operation.

B 9/17

NOTES 9-16-63 KUERS

1. Personnel:

Mr. Jack Trott, my deputy, has gone to Georgia Technical Institute in order to obtain his master and doctor degree in industrial engineering. He does this on the Government Training Program and hopes to accomplish this in about 1 1/2 years. I have told him that I cannot keep his present position in ME Laboratory open for him until he has completed his education. He wants very much to come back to this Laboratory and would accept at that time any other position I could offer to him.

WK Who'll be your new deputy? B

2. Saturn V, S-IC Stage:

a. We have successfully completed the meridian welding of the lower bulkhead for the Fuel Test Container. The lower edge has been trimmed and the bulkhead moved to the close-out welding station. ✓

b. Ring baffle installation for the upper bulkhead is still held up because of lack of parts manufactured at Seattle. Delivery of these components is now promised for this week. ✓

c. K&T (Kearney & Trecker) tape controlled skin mill loading:
I have made an arrangement with Mr. Stoner to form a task group for detail study of this problem. This task group started working last Saturday in the HIC building. Chairman is Mr. Coenen from Boeing, with our people participating in analysing the effects of a transfer of some of our Saturn work to Seattle. We have also contacted the Air Force representative in Wichita and learned from them that only one machine in this place is needed for the B-52 work. It appears that the capacity of the third machine in Wichita is being used by Boeing for commercial work. The results of the exercises of the task force will be reviewed this Friday, September 20.

d. It might be of interest to note that Boeing had stated in writing in the "Make and Buy" Plan, issued June 1963, that the capacity for this work was existing in Wichita.

WK
Please keep me posted B

NOTES 9-16-63 LANGE

B 9/17

1. SATURN I - SA-5 - S-I-5 and IU-5 work at AMR is proceeding satisfactorily. After successful post static checkout, the S-IV-5 was removed from the stand on 9-14-63. The estimated shipping date is still 9-20-63. ✓

Pregnant Guppy - Damage to the P. G. at L. A. International Airport on 9-11-63 has been repaired. The aircraft was operational again on 9-13-63. ✓

S-I-9 - The earliest estimated delivery date for certain ASTRIONICS components (TM packages) is February 1964, based on late procurement actions. It is our understanding that this date is contingent on sole source procurement being initiated immediately. This delivery will permit installation in time for a delayed checkout and subsequent operations to meet the "target" schedule but of course not the OMSF schedule. This will require that S-I-9 be stored after completion of assembly for approximately 3 1/2 months before checkout can begin. (Recommend not reporting this to Hqs pending further review.) ✓

O.L. Ask. gave us a very different story! B

2. SATURN V - S-IC - The problem concerning the requirements for intercommunications and closed circuit T.V. for stage checkout at Michoud and M-QUAL was resolved between MSFC and Boeing in meeting on 9-9-63. ✓

Gore Assembly Fixture - Re Notes 9-3-63 Lange (Attachment 1) - Fixture has been repaired at Wichita and is being returned to Michoud. Preliminary estimate is that no schedule impact will result from this damaged tool. Repair cost is about $9300. Unless the Gov't elects to prove negligence, NASA will have to pay the cost. ✓ O.L. → What do you recommend? B

S-II - Negotiations with S&ID for Amendment #5 are scheduled to start at MSFC on 9-24-63.

The use of substitute parts in the EMM and Battleship continues to be a major concern. The heavy influx of substitute hardware dilutes the confidence level and causes an increase in program cost. M-SAT has asked S&ID for a monthly status report on the use of substitute hardware so that MSFC can be fully cognizant and take corrective action when needed on an item by item basis. ✓

S-IVB - Quarterly Review was held on 9-12-63 at MSFC. Material presented by DAC is being evaluated. ✓

3. APOLLO - Preliminary Emergency Detection System for SATURN IB and V was reviewed by the Crew Safety Panel on 9-11-63. This specification will be released for design. ✓

Electrical Systems Integration Panel met at MSC on 9-12-63. - MSFC presented the General Specification for Cables for approval. ✓

An official ICD for SA-10 will be released by next Panel meeting. ✓

The Electrical Systems Integration Panel recommends to the Launch Operations Panel that the BP-13 umbilical arm retract no later than 15 seconds before ignition. ✓

B 9/17

NOTES 9-16-63 MAUS

1. VISIT BY BOB REPRESENTATIVES - NASA's three principal representations in Bureau of Budget will be here next week for a look at MSFC activities. They are: Don Crabill, Terry King, and Franz Kretzmann.

   Their general areas of interest are:
   Organization and management
   Project Resources and Schedules
   In-house operations (Personnel and Facilities)

   I have arranged with Bonnie for you to greet them briefly at 9:30 a.m., Monday, September 23. We are preparing their schedule for the remainder of the week. ✓

2. VALIDATION COMMITTEE REPORT - The Validation Committee appointed by Dr. Seamans will present a complete report of their findings to Dr. Seamans today. We were told at the outset that center directors would be briefed on the findings prior to presentation to Dr. Seamans. Cadle and Wyatt have apologized for not being able to come here first; they were just not able to complete the report, have a preliminary review with us, and still meet Dr. Seamans' deadline of today. ✓

   In view of this, Bill Fleming and Don Cadle will come here Tuesday (Sept 17) to give you the same briefing they will give Dr. Seamans. Al Siepert and Rocco Petrone will be here from LOC. The committee plans to give the briefing to Mr. Gilruth in Houston, Wednesday. We have had an opportunity to review most of the data collected, but have not seen the recommendations and conclusions. ✓

3. FY 64 BUDGET - ADMINISTRATIVE OPERATIONS - You will remember that we had a $20 M funding shortage in Administrative Operations (Personnel Costs and Operation of Installations) activities for FY 64--$148 M required versus $128 M authorized. We attempted to overcome this by transferring certain of the computer and communication costs to R&D, but headquarters did not feel that BOB would permit this, as these items had been separately identified. We must solve this problem before we can hire up to the 8023 personnel ceiling. ✓

B 9/17

NOTES 9-16-63 MRAZEK

1. BLAST HAZARDS: Dr. J. B. Gayle of this laboratory and personnel from Edwards Air Force Base made a joint presentation on the blast hazards program to NASA Headquarters on 8-29-63. Dr. Harvey Hall commented that he was favorably impressed with the program. ✓

2. KIWI B-4 COLD-FLOW TESTING: Preliminary post-mortem examination of the KIWI B-4 cold-flow testing held 8-21-63 indicates that longitudinal cracks, which occurred on B-2 testing (reported in NOTES 9-9-63 MRAZEK), did not occur. Four fuel-element cluster tie rods broke at the root thread in the reactor inlet plenum. The tie rod material, combined with the thread design, could logically explain this failure. A non-notch sensitive alloy is on order for the new tie rod design. ✓

3. MS AND MC FITTINGS: (Reference NOTES 9-3-63 MRAZEK, paragraph 2.) MS fittings are Military Standard. MC fittings are Marshall Center--designed and developed by contractor under MSFC supervision--with closer tolerances and better quality control. ✓

4. J-2 HYDRAULIC PUMP TESTING SUCCESSFUL: At least ten tests were conducted with the Douglas Aircraft Company-Vickers hydraulic pump, including two long-duration runs. It appears that the hydraulic pump development for the J-2 engine has passed a major milestone. ✓

5. J-2 ASSESSMENT TEAM MEETING: During this development review period (five months), 218 engine tests and 12,563 mainstage run-seconds were accumulated. Four hundred twenty engine tests and 15,000 seconds mainstage-run duration have been accumulated to date. An engine diffuser attached to the thrust chamber exit has been developed. This negates the requirement for elaborate and costly facility diffusers at the stage static test sites to allow full flow of the engine nozzle at a chamber pressure less that 690 psia (injector end). Propellant utilization excursion will lower chamber pressure to 570 psia. Early engine development was plagued by combustion instability that occurred during the start transient due to 190°R or lower fuel injector temperatures. Injectors have been developed that are capable of 55°R fuel injection temperature without instability occurring. ✓

6. UPRATING OF H-1 ENGINE: Rocketdyne has proposed three plans for increasing the performance of the H-1 engine:

a. Uprating the qualification configuration engine to 200,000 pounds thrust by reorificing the propellant feed and gas generator systems.

b. Uprating the qualification configuration engine by introducing fluorine into the liquid oxygen propellant.

c. Developing a new engine system, designated the H-1E, which utilizes the basic H-1 configuration and components with the exception of a direct-drive turbopump. The basic design thrust rating would be approximately 250,000 pounds. (This would be wonderful, but would require a major structural redesign.)

Hardly

Hardly

W.M.

Attachment No. 1: NOTES 9-3-63 MRAZEK
Attachment No. 2: NOTES 9-9-63 MRAZEK

MSC tells us that the Sat I would be a fas most attractive LV, if payload could be raised to 23,000 lbs. Is that possible in an easy way? B

B 9/17

NOTES 9-16-63 RUDOLPH

1. Reference your annotations on my Notes 9-3-63:

   a. You are so right - already no dull moment. I wish a day had 100 hours.

   b. Following your suggestion, I will talk with Jerry McCall re IU, and also with others concerned. When the need arises, I am sure I will be calling on you for help.

2. Organizing the "Industrial Operations"

   I am continuing that work with Eberhard Rees, Hans Maus, Hans Hueter, etc.

3. Saturn V

   I have met repeatedly with Jim Bramlet and his staff, and am getting into the act also by participating in budget meetings, etc.

Frank Williams

Please show Mr. Rudolph some of the other NOTES as samples of that kind of stuff ought to be reported. This one here is a bit chatty and lacks meat.
Good samples of 9-16-63:
Mrazek, Knerr, Lange, Shepard.

B 9/17

NOTES 9-16-63 SHEPHERD B 9/17

1. S-II: On August 29 a letter of notification was transmitted to the Senate Committee advising them that $9M of FY-64 RD&O funds would be used for the S-II facilities. Upon receipt, the counsel for the Committee said that the action was not illegal but that the "continuing resolution" was not intended for this action and that he intended to look further into this matter. The FY-64 S-II facility requirements are made up of projects deferred from FY-63 and new requirements generated by North American Aviation. It is felt by Facilities Engineering Office and the Saturn Systems Office that the known requirements are approximately $6,000,000 but a total of $9M was requested to provide a contengency to elinimate the necessity of another letter to Congress if an emergency facility project should arise. This approach is known and concurred by OMSF. A breakdown of the project by location is as follows:

Downey	$ 680,000
Santa Susana	$2,612,000
Seal Beach	$5,708,000 (included at Seal Beach is $1,800,000
	$9,000,000 Requested to complete the Vertical Assembly & Hydrostat Facility and

$470,000 which permits award of the Structural Static Test Foundations and Pneumatic Test, Paint and Packaging Facility, These awards preclude any delays in the S-II program due to facilities.)

2. A-E Selections: The A-E Selection Board is inducing in its next recommended list, firms with a wider geographical dispersion. We have included a firm from Chicago; Newark, New Jersey; Pottstown, New Jersey; and a repeat selection on the West Coast. This should overcome some of the criticism we have received regarding the parochial nature of some of our A-E selections.

3. Water Pumps at Mississippi Test Facility: There may be further difficulties arise regarding the award of a contract for pumps for the High Pressure Industrial Water System at MTF. The request for proposal stated that evaluation of bids would be based upon first cost plus estimated operating cost over 15 years and, on this basis, only $15,000 separates Nordberg from Fairbanks-Morse. The latter, as second low bidder, is continuing to object to some of the elements of the evaluation.

Frank Williams -
I think I owe the Speaker's office another call on this matter. Please get me latest, reliable dope. B 9/17

NOTES 9-16-63 Stuhlinger

B 9/17

1. SUPPORTING RESEARCH PROGRAMS: The FY-65 detail budget submission was completed and forwarded to FMO for those programs for which I have program manager responsibility. The Headquarters guidelines for FY-64 were as follows:

OMSF	$13.4 M
OART	9.334 M
OSS	.970 M
TOTAL	$23.704 M

OART has forwarded a list of FY-64 approved tasks and this information has been forwarded to the laboratories. The total FY-64 program authority has not been received. Its amount is still unknown.

The latest official word from Headquarters Office of Manned Space Flight is that 70 Launch Vehicle Supporting Technology research tasks have been approved for the sum of 5.08 million, and signed off by Dr. Seamans. The program authority to fund these tasks is due at MSFC the week of September 15, 1963. This is less than half the total number of tasks submitted to Headquarters last May. The funding guidelines that were sent to us for FY-64 totaled 13.4 million, which, in our opinion, is 4 million short of the requirements at Marshall. Now, with only a 5 million dollar program being approved, it appears that the Launch Vehicle Supporting Technology research program is regressing to a new low.

E.S. Is this FY64? How final is that? B

2. RADIATION EFFECTS ON DETECTOR PANELS FOR METEOROID MEASUREMENT: Tests completed at Ling-Tempco-Vought in Dallas have been analyzed. Of about 3,000 individual discharges by electron irradiation, no pulses greater than 6 volts were noted. High frequency pulses of 30 to 40 volts were common. Conferences with Fairchild Stratos Corporation electronic design engineers indicate that discrimination between the irradiation pulses and meteoroid pulses can be effected by relatively minor changes to the electronics systems currently planned. FSC will have a "breadboard" model available for tests at L.T.V. on Thursday, 19 September. Dr. Johnson will participate in this test series.

We feel that the problem of the space radiation environment most probably is less severe than was concluded on the basis of earlier Langley observations. RPL and L.T.V. are currently conducting additional tests to further verify present results. Rates of spurious pulses seem less frequent at the low radiation dosage of space than was assumed by the Langley group.

3. ALSS PAYLOAD STUDIES: A report entitled "Scientific Packages for Apollo Logistic Support System Payloads," written by Dr. Alfred Weber and Mr. George Bucher of RPL has just been released. This report describes in detail the scientific experiments and instruments required for ALSS (LEM and Saturn V) payloads. This report will satisfy a request from the Office of Space Sciences for our proposed ALSS scientific program and will provide a basis for other segments of MSFC to continue their conceptual design efforts on ALSS payloads.

E.S. Please send me a copy B

September 23, 1963

NOTES TO MUELLER - 9-24-63 - DEBUS

1. Saturn SA-5. Revised flight safety data for SA-5 had been submitted earlier this year to the AMR Range Safety Division. Upon their evaluation, they requested some additions to the data pertaining to the overflight of Africa. These data and some additional explanatory aerodynamics information were submitted in the meantime, and it is expected that we will receive official approval for launch in the near future. (Note: It is possible that large parts of the Saturn booster could float after impact and create a shipping hazard. I have asked AFMTC to conduct a survey of the "fall out" area after impact to eliminate floating debris if it should occur.)

2. S-IV-5 Acceptance Review. A review of the S-IV-5 stage configuration, documentation, loose parts, and pending modifications was held at SACTO, attended by MSFC and LOC. A master set of up-to-date electrical schematics (red-line drawings) was discussed as part of the documentation package. DAC contended that AMR had been provided with all changes and their schematics should be up to date; however, they did concede the time delay (4 to 6 weeks) in distribution of these changes. It was finally agreed that a "red-line" master set of vehicle schematics would accompany the stage to AMR.

3. Administrative Management Services (MILA). Requests for Proposals as contemplated in the original Procurement Plan approved by Headquarters were issued September 13. A pre-proposal conference is scheduled for September 23. The closing date for receipt of proposal is October 14.

4. Operation and Maintenance of MILA Communications System. Proposals were opened on September 11. Fourteen proposals were received, and are being evaluated by the business and technical committees. The evaluation will result in a listing of all bidders as a numerical ranking of the evaluation committee's findings. The findings will be presented to the Administrator and the Deputy and Associate Administrators, plus their selected staff, during the week of September 30. Conventionally, we have given the briefing to Brainerd Holmes in order for him to effect the format and detail of the presentation prior to presentation to Mr. Webb. Al Siepert will check whether you want a dry run on this.

5. A Draft Contract for the Administrative Communications has been completed by P&C and forwarded to Southern Bell for their comments.

6. Apollo System Specification. Under the direction of OMSF, Bellcomm is preparing an Apollo System Specification. It was necessary for LOC to meet with the Bellcomm representatives, Capt. Holcomb, and Mr. D'Onofrio, in order to reconcile differences and reach agreement. This has been accomplished and an acceptable draft was drawn.

7. General Electric Co. PACE Task Order. Discussions were held with GE which centered around an attempt to reach an agreement on the wording of the work statement concerning GE responsibility under Task Order MSC/POD-1 which requires design, fabrication, installation, and checkout of two Pre-launch Automatic Checkout Equipment Spacecraft (PACE-S/C) Ground Stations. Serious differences of opinion between GE and the Government exist. LOC has re-written the part of the statement of work causing the controversy. Further attempts will be made to reach agreement.

8. MILA Contracts Summary. The following information on the Merritt Island Launch Area was compiled for general release:

NASA funds obligated on MILA to date:	
Corps of Engineers -	$ 95,325,394
Bureau of Public Roads -	332,846
LOC P&C -	27,056,091
Total	$122,714,331
Number of Contracts Let:	
Through Corps of Engineers -	68
Through LOC-P&C -	56
Total	124

9. Foundations for VAB (Contract NASA-10)

a. 17,000 L. F. of piling driven in the past week for a total of 217,000 L. F. of required 674,000 L. F.

b. 700 C. Y. of approx 40,000 C. Y. of concrete placed to date.

c. Pile-driving is ahead of schedule. Overall contract is approx. 2.2% behind schedule, largely because of strike. Approx. three days lost due to strike.

10. FY-1965 RD&O (Direct) and Operation of Installations Budget. Estimates were submitted by LOC on 16 September 1963. The RD&O (Direct) budget totals $122, 564, 000. The Operation of Installations budget included two submissions, estimates within established ceilings and minimum requirements. The ceiling established by NASA Headquarters was $47, 700, 000 and the LOC minimum requirement is $50, 699, 325 which is primarily due to our requesting 2316 Civil Service spaces, an increase of 247 from the established ceiling.

11. Central Control Bldg. Addition and Telephone Exchange Bldg. Bids opened September 17, 1963; three bids received. Apparent low bidder was Woodcrest Construction Co. in the amount of $797, 310 (combined bid); Government estimate was $894, 058.

12. Bridge Cranes for VAB. Bids opened September 19, 1963; Three bids received. Apparent low bidder was Colby Crane Manufacturing Co., Seattle, Washington in the amount of $2, 179, 000. Funds allotted for this work were $2, 550, 00--total Current Working Estimate (CWE). This appears adequate.

13. Slush Hydrogen Utilization and Helium Recovery. A preliminary draft of the scope of work for the study on "Slush Hydrogen Utilization and Helium Recovery" has been prepared. The study of slush hydrogen (liquid hydrogen cooled to 13. 8^{o}K and containing frozen hydrogen in suspension) is to determine, through analytical and experimental procedures, the characteristics and properties of slush hydrogen. Based on these results, the study will define the ground support equipment required to handle slush hydrogen. The study includes helium recovery, re-use methods, and feasibility, as the anticipated use of slush hydrogen will require large quantities of helium for tank pressurization in addition to the great quantities already scheduled for future use. In-house efforts are under way to closely monitor the study.

14. Saturn V Destruct Methods. Ballistics Research Laboratory (BRL) representatives believe presently planned method of destruct (linear shaped charges) would give far greater yield than proposed bulkhead method. Also the fireball diameter will be greater for vapor explosion than for liquid explosion. BRL is willing to conduct small-scale tests to evaluate the situation. A limited number of small-scale tests should suffice, and LOC has started action to obtain them from BRL.

15. Status of Contract for Cryogenic Engineering Service. Technical evaluation of the proposals for "Cryogenic Engineering Services for LC 39" was forwarded on August 20, 1963. Air Products and Chemicals, Incorporated (Allentown, Pa.), has been selected as the contractor for this work, subject to approval of Headquarters.

16. Personnel Management Evaluation. A group, headed by Mr. Walter Wilson of the Headquarters Personnel Division, is in the process of conducting an evaluation of our Personnel Management Program. It is anticipated that this group will conclude their evaluation and conduct a "close-out" about September 27th.

17. Automatic Data Processing for PERT. A PERT system has been developed by LOC utilizing the 1410 computer. This is the first PERT system developed in NASA utilizing a commercial computer. NASA Headquarters is contemplating adopting this system for implementation throughout NASA. A representative from the PERT Systems Office, NASA Headquarters, visited LOC last week for discussion on this.

18. Pickets at MILA. Appropriate action was taken following the appearance of pickets at MILA. Corps of Engineers were urged to instruct contractors to proceed with the work since picketing was not recognized by the Brevard County Building and Construction Trades Council. Contractors in turn demanded unions to man the jobs and later filed charges under the National Labor Relations Act. This office cooperated with the National Labor Relations Board attorneys by providing office facilities and assistance in conducting investigation. Also assisted in preparing impact and informational statements for Headquarters office in Washington and keeping a general surveillance of work stoppage resulting from railroad unions picketing.

19. Secretary of Labor Hearing on Railroad Strike. On Monday, September 30, the Assistant Secretary of Labor for Labor Management Relations, Mr. James Reynold; Special Assistant to the Assistant Secretary, Jack Gentry; Assistant Secretary of Defense, Stephen Shumman; and Walter L. Lingle and Earl D. Hilburn of NASA Headquarters will be at LOC for the purpose of holding a hearing on the strike situation at the Cape.

B 9/25

NOTES 9/23/63 CONSTAN

1. SAFETY SURVEY

A survey of the safety program of Michoud Operations was conducted last week by the MSFC Safety Office. The safety programs of the prime contractors were reported to be satisfactory. The principal recommendation made by the safety office was that the prime contractors be required to insert a safety clause and monitor the clause requirements in all sub-contracts. Michoud Operations concurs in this recommendation and is initiating action to implement the recommendation. ✓

2. UGF

The United Fund campaign for MSFC Michoud Operations started last week. Michoud Operations participates in this drive with all the Federal Agencies in New Orleans. You will be informed of the extent of MSFC Michoud Operations participation at the completion of the campaign. ✓

3. GENERAL ACCOUNTING OFFICE REVIEW

The General Accounting Office is presently conducting a review of the prime contractors at Michoud Operations. Presently they have two people at Michoud who are reviewing the Chrysler Corporation Space Division negotiation and contract files. GAO plans to add two additional auditors within the next couple of weeks. ✓

4. S-IC QUARTERLY REVIEW

The S-IC Quarterly Review has been scheduled for October 9 and 10, 1963 in the Director's Conference Room, Building 4200. ✓

5. S-I-8

All engines have now been installed on the S-I-8 vehicle. This vehicle is on schedule and due to be shipped from Michoud to Huntsville in December of this year. ✓

6. HEADQUARTERS VISIT

The following individuals from NASA Headquarters visited Michoud Operations on September 19, 1963. Dr. Robert C. Seamans, Associate Administrator, Dr. George C. Mueller, Deputy Associate Administrator for Manned Space Flight, John D. Young, Director Office of Administration, Dr. Joseph Shea, Deputy Director (Systems) OMSF, George Low, Deputy Director, (Programs) OMSF, Capt. Robert F. Freitag, Director Launch Vehicles and Propulsion, OMSF, Capt M. J. B. Kahae, Special Assistant to the Deputy Associate Administrator and Clyde Bothmer, Executive Assistant to the Director, OMSF. They were accompanied during their visit by Dr. von Braun, Dr. Hans Hueter, Harry Gorman, Frank Williams. A general orientation program status and review was the subject of their visit. ✓

B 9/25

NOTES 9/23/63 DAVIS

No notes.

NOTES 9-23-63 FORTUNE

B 9/25

1. Delays From Last Week's Rain: Hurricane fringe rains were heavier than reported in Huntsville as you must have noted from an aerial view of the Test Facility. Many of our dirt construction roads were impassable when I tried driving around the site on Friday. However, our most vital job, Lock and Bascule Bridge excavation, was able to get dewatered and trucks were active hauling spoil to the S-V fill area. Two to four days time was probably lost because of "Cindy."

2. Mississippi Visit: Your forthcoming Mississippi visit schedule will be furnished by separate paper. You will recognize our need for helicopter service in order to fill engagements. This will also be an excellent opportunity to emphasize the need for local communities to look ahead in their planning to assure proper zoning, adequate street layouts, and sufficient roads factors so that progress from our NASA economic influx will be orderly and as they would desire it, not uncontrollable nor cataclysmic. We regretfully declined an invitation for you to judge a beauty contest; however, you may be asked to comment on how you feel about integration with Russians on the Lunar Program.

NOTES 9/23/63 GEISSLER B 9/25

1. Entry Survivability Predictions for Saturn SA-5 Orbital Debris: Lockheed Missiles and Space Corporation (Huntsville operations) under Contract NAS8-5257 has made analytical studies to determine the reentry survivability of Saturn Hardware. Resultant predictions for SA-5 orbiting hardware are as follows: (1) There is a 95% confidence that at least 42% of the total weight, or 7434 kilograms will survive entry heating. (2) There is a 75% confidence that 47% of the total weight, or 8265 kilograms will survive entry heating. (3) There is a 50% confidence that 62% of the total weight, or 10,827 kilograms will survive entry heating. The above total weight numbers include 6169 kilograms of sand ballast which is considered not to be an impact hazard due to probable dispersion of the sand particles. With this weight discarded, the total survival weight for 95, 75, and 50 per cent confidence levels becomes 1265, 2096, and 4658 kilograms respectively. Due to ballistic factor variations (0.1 $kg/_{m}2$ to 400 $kg/_{m}2$) for the various components, the downrange dispersion will be as high as 4000 kilometers.

2. Meeting on Weight Savings Plan for Saturn I, IB, and V in Directors Conference Room on September 12, 1963: During subject meeting, questions were raised as to the validity of the center of pressure data that was used in the control study presentation for the Saturn V (S-1C stage with no fins). Subsequent to the meeting, the presented center of pressure data was verified to be correct. This presentation was made in support of the need for keeping fins on the Saturn V (S-1C stage) vehicle.

3. Mission Control Operations Panel (MCOP): Dr. F. Speer, Mr. E. Nathan and Mr. F. Kurtz attended the MCOP Activities Review Meeting at Houston on September 13, 1963. An agreement was reached to the effect that (1) MSFC will generate Saturn Engineering Instrumentation Requirements Documents (EIRD) defining all instrumentation requirements for engineering evaluation upon LOC/AMR and OTDA/GSFC; and (2) MSC will prepare Program Instrumentation Requirements Documents (PIRD) defining all Apollo engineering and mission control instrumentation requirements.

NOTES 9-23-63 GRAU

B 9/25

1. S-I-5 ELECTROMAGNETIC COMPATIBILITY TEST: Reference item 1, Notes 9-9-63 Grau, subject as above (copy attached), the symbol "LO-I" stood for the Electromagnetic Interference Section of Launch Operations Center, the abbreviation "EMC" for electromagnetic compatibility.

2. S-I-6 POST-STATIC CHECKOUT: Instrumentation Checkout is continuing on S-I-6. Telemeter calibration tests were completed September 19, 1963, simulated plug drop test began September 20, 1963.

3. S-IU-6 FINAL CHECKOUT: Instrumentation Checkout is proceeding satisfactorily on S-IU-6.

4. S-IV-5 CHECKOUT AT SACTO: All of the hydraulic systems on S-IV-5 were found to be contaminated, as was the ground servicer which contained a filter that was outdated by approximately 1½ years. Hydraulic systems were cleaned and accepted by MSFC on September 14, 1963. The stage was flown to AMR Sept. 20, 1963.

5. S-IV-6 SHIPMENT TO SACTO: The tentative shipment date of the S-IV-6 vehicle to SACTO is now September 27, 1963.

6. LOCKHEED MISSILES SPACE COMPANY SURVEY: A recent tour of the Lockheed electrical assembly areas for the Polaris Missile System revealed the proficiency currently demonstrated by Lockheed electrical assemblers is far short of that which must be required on the RIFT program. Copies of the MSFC High Reliability soldering procedures, samples of printed circuit boards and of terminals with conductors soldered in are being sent to Lockheed to start them thinking our way. At a later date, it is planned to have their personnel certified to solder in accordance with our specifications.

7. QUALIFIED PRODUCT LIST, DIODES AND RECTIFIERS: A qualified product list for procurement of diodes and rectifiers qualified under MSFC screening specifications has been completed and assigned number QPL-D-200. The list is based on preliminary qualification testing experience and will be periodically revised as this experience increases.

Attachment #1: Notes 9-9-63 Grau

NOTES 9-9-63 GRAU

1. S-I-5 ELECTROMAGNETIC COMPATIBILITY TESTS: Coordination with (LO-I) has resulted in plans being formulated for this Laboratory's participation in the (EMC) tests of S-I-5 at the launch site.

2. S-I-6 POST-STATIC CHECKOUT: Final electrical checkout of the S-I-6 continues with satisfactory results in checkout station B of Building 4708.

3. S-IU-6 FINAL CHECKOUT: Minor leaks in the air bearing air supply system of S-IU-6 have been reworked and final checkout is progressing satisfactorily.

*4. S-IV CHECKOUT AT SACTO: As of September 6, 1963, all of the subsystems tests on S-IV-5 have been accomplished. Clean-up work is to follow with checkout completion expected by September 10-12. Limited Electromagnetic Compatibility Tests of S-IV-5 at the launch site appear to be feasible.

5. PROPOSED RELIABILITY/QUALITY/MAINTAINABILITY STUDY: A proposal for a R/Q/M value engineering study for NASA by Kollsman Instrument Corporation was discussed with Mr. Koppenhaver during his recent visit. The study will attempt to develop a management tool with which to optimize NASA's return on its R/Q/M investment, to relate dollar costs versus results. This will be discussed further with Mr. Koelle to formulate a Center input for a possible headquarters contract.

6. MICROMETEOROID MEASUREMENT CAPSULE PROGRAM REVIEW: Representatives from this Laboratory attended the fourth Micrometeoroid Measurement Capsule Program Review Meeting at Fairchild Stratos Corporation, Hagerstown, Maryland. Their quality program is, in general, progressing satisfactorily.

7. REPRESENTATIVES FOR CONTRACT REVIEW: With the placement of a representative in P&VE Laboratory, we now have contract review for quality requirements in all laboratories.

Attachment #1

NOTES 9-23-63 GRUENE B 9/25

1. Wind Limitations: (Your question last week, copy of Notes 9-16-63 Gruene attached.) The present wind limitation on pad is 16 knots on the 10 foot level.

a. If these limitations are not modified by P&VE in a meeting called for September 24, network modifications have to be made for pressurization of tanks every time the Service Structure enclosures are opened or when, for certain tests and the countdown, the Service Structure will be removed completely.

b. If pressurization will still be necessary, modifications will be made on the pad, but would not affect the schedule.

c. Impact on vehicles on Pad 34 would be higher because no enclosures are on the Service Structure and continuous pressurization would be necessary after erection.

d. Occurrences like this can, in my opinion, not be avoided 100%, but we always will make the designer aware of discrepancies as soon as we find out that criteria would affect our operations. We always have in the past worked out these problems without affecting schedules, but I think you should be aware before possible problems arise.

2. SA-5 Schedule: LVO received notice from Mr. Fichtner's division prohibiting mating of S-IV stage to S-I stage prior to a final design review by Astrionics. This design review could not be accomplished because of missing documentation. M-SAT was informed of this by Mr. Fichtner and was made aware of the seriousness by LVO. If this design review cannot be established prior to October 8, 1963, the firing of SA-5 has to slip day by day. ✓

3. Facilities: Astrionics provided LVO with two trailers which will greatly improve our participation in breadboard operations and computer program generation. ✓

Attachment
Notes 9-16-63 Gruene

Killy Murdock
Request your comments to this and Notes Gruene 9-16-63
B
(Somebody must have changed wind-on-pad criteria without telling LVO. How is that organizationally possible?) * safeguards? yes

NOTES 9/23/63 HAEUSSERMANN

B 9/25

* 1. S-IV-5 SERVOACTUATOR TESTS: Three troubles were encountered.

a. Leakage of fluid through the engine-driven pump shaft
b. Two bent potentiometer shafts and a defective telemetry potentiometer element
c. Inaccurate determination of fluid contamination count by DAC/SACTO personnel.

The responsible DAC design engineer and Mr. Howard (ASTR, G&C Div) assessed the leakage as being inconsequential after careful observation and discussion, and felt that the consequence of changing the pump would be detrimental rather than an improvement to the system. Quality personnel, including M-QUAL personnel, recommended replacing the pump. Our understanding at this time is that the pump will be replaced. ✓

The best assessment at the present time on the telemetry portion of the potentiometer failure is that newness of personnel and test equipment led to damage to the element during pre-checkout operations. I called Mr. Gordon, DAC, who confirmed these findings. He promised "it will not happen again." ✓

The contamination levels reported by DAC have been very low but have not been substantiated at MSFC with differences of at least one order of magnitude. The seriousness of the situation is best realized when it is recalled that the hydraulic research valve used in this system is susceptible to contamination effects because of an extremely low first stage gain, 38 psi/ma compared to a first stage valve gain in the redesigned system of 200 psi/ma. Furthermore, several instances of hardover actuators have occurred which can best be explained by this low gain condition. ✓

* 2. SATURN ALIGNMENT LOOP TESTS: Theodolite and alignment design proofing tests have been completed at Cape Canaveral on Pad 37B Tower. All test conditions were exactly those of the actual operational system except the platform was mounted in a special stand on the working platform that services the I.U. All design objectives were proven to be satisfactory. This was the first time the complete alignment system was in operation and the following design concepts proven.

a. Two prism capability
b. Spectral light separation at the prism face
c. Dual channel theodolite
d. Continuous program in azimuth
e. GSE digital encoder follower

Additional theodolites with special stabilizer covers permitted limited accuracy checks to be made. The system tested had a 10 arc sec error with a clockwise azimuth program and 30 arc sec error with a counterclockwise azimuth program. The azimuth alignment error specification is 36 arc sec. ✓✓

3. SATURN V TELEMETRY: Based on discussions with Dr. Rees, Mr. Gorman, and recently within Dr. Mueller's presentation, it appears advisable to present the status of Saturn V telemetry and procurement including documentation to you. First possibility is during week of 10/7.

W.H. Yes, I am most eager to hear that story B

NOTES 9/23/63 HEIMBURG B 9/25

1. SA-7:

Preparation for static firing of SA-7 is continuing on schedule. Short duration planned 10/1/63; long duration firing 10/15/63.

2. S-IV-5:

The Pregnant Guppy left Sacramento, California, with S-IV-5 aboard, 6:24 am., Friday, 9/20/63, and arrived LOC skid strip 4:09 am., Saturday, 9/21/63 (via Las Vegas, Amarillo, and Mobile) - time enroute 20 hours. S-IV-5 safe in LOC hangar and preliminary inspection indicates the stage received no damage during flight.

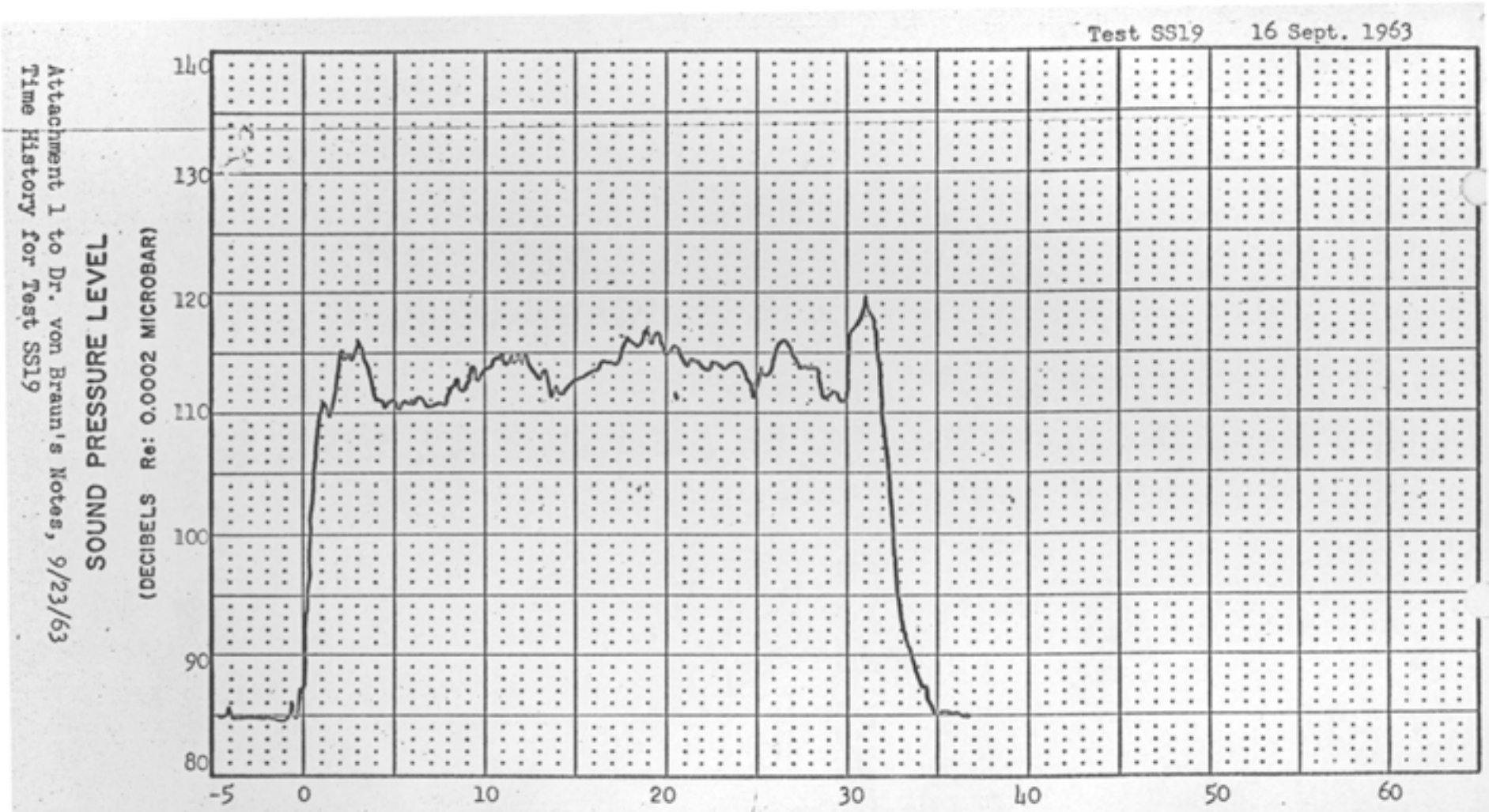
3. H-1 SOUND SUPPRESSOR:

In recent firings, gas temperatures showed periodic spikes at approximately 8-second intervals. These temperature spikes in test SS-19, 9/16/63, caused slight damage to the impingement plate and to the diffusor. Similar periodic fluctuations were also observed in the recirculation water flow-rate. These fluctuations can now be identified as an effect of sloshing of the water mass in the walls of the sound suppressor. This sloshing also has a pronounced effect on sound pressure level, as shown in the attached plot. It is planned to install slosh baffles to eliminate these oscillations.

4. HOLDDOWN ARM ACTUATOR TEST (S-IC TEST TOWER):

In order to furnish data in time for use in final design, tests on the basic Philadelphia roll ramp unit were terminated after approximately 64 hours test time. This unit was load tested with an average dynamic load of 1500 kips at 7.5 c.p.s. Static load tests were completed in 250 kips intervals up to 3000 kips. Tests were terminated because data obtained were considered adequate and further testing would unnecessarily delay delivery of the finished units. The test was considered a success. Preparation of the test fixture for load testing a single holddown arm, complete with roll ramp actuator, is continuing on schedule. Testing should start around 11/1/63.

1 ATTACHMENT:
Time History for Test SS-19.



Attachment 1 to Dr. von Braun's Notes, 9/23/63
Time History for Test SS19

FIGURE 2: Overall Time History For Test No. SS19 From Microphone At 100M, 60°

B 9/25

NOTES 9-23-63 HOELZER

*1. BURROUGHS B-5000: We are experiencing considerably more difficulty than we anticipated in obtaining from Burroughs a satisfactory set of software for the B-5000 computer. Since we have had the computer, we have received from Burroughs several versions of the software package, commonly called the Master Control Program. None of these have operated to our satisfaction. We have arranged a meeting with Burroughs for today and tomorrow to attempt to resolve this problem. ✓

H.H. Looks like someone has goofed here!? B

2. INTERRUPTION OF COMPUTER SERVICE: During a recent heavy rain, construction modification to Building 4491 allowed some 4 inches of water to accumulate under the 1410 computer creating considerable electrical hazard. Equipment was shut down for about 19 hours while the necessary drying out process was carried out. No permanent damage seems to have been done to the equipment. ✓

3. DATA SWITCHING CENTER: The ADX 7300 Data Switching System has been installed in building 4207 and accepted from I.T.T. Company. Workloads will now be assigned to the system progressively, beginning with teletype and facsimile terminals. The system will be programmed and operated under the new Data Center Branch. ✓

*4. GENERAL ELECTRIC CONTRACT: Our proposed procurement plan for obtaining a contractor for the Computation Laboratory is still in Washington awaiting approval. In general, NASA Headquarters approves of our plan, but has come back requesting that we not write a cost-plus fixed-fee contract, but rather an incentive-type contract. We have, upon the advice of P&C, concurred in rewriting that portion of the procurement plan so that in the coming years our contractor will operate on an incentive basis. ✓

H.H. What incentive formula do you offer him? B

NOTES 9-23-63 HUETER B 9/25

* SATURN IB/CENTAUR/VOYAGER STUDY: According to the latest loads and structural information received from P&VE for the Centaur configurations, all four basic and shortened configurations (sized by limiting the performance to a 6000# payload, with a C_3 energy level of 22 km^2/sec^2) are flyable on the Saturn-IB vehicle without structural modifications. Payloads up to 8500# are possible if a sub-orbital start for Centaur is considered. A Load Relief Control System may be necessary for the latter case to limit loads on the Saturn-IB.

~~Experience gained from the Centaur Study indicates a payload potential of over 10,000# for the S-VI stage if sub-orbital start is used. This appears to be the only significant advantage that the S-VI version of the MMM has over the Centaur stage.~~

Second paragraph stricken at request of Mr. Betko. In phonecall 9/25/63 he said that this was in error. BH 9/25/63

H.H.

How does the Saturn IB/Centaur combination look for those hypobolic reentry tests with Apollo? No one is too hot about activating any Voyages carrier at this time, but those reentry tests are an important milestone of Apollo and so far completely unresolved!

B

NOTES 9-23-63 Koelle

B 9/25

1. MEETING WITH E. Z. GRAY

I had my first discussion last week with Mr. Edward Z. Gray, Director, Advanced System Studies at OMSF. He succeeded Dr. W. Lee. Mr. Gray came from Boeing and was in charge of Advanced Space Systems there, along with others of the Boeing Space Station Study and the Lunar Base Study. I have met him a few times in the previous years and I believe we have set the stage for very good relationship. He is not only a knowledgeable man in the field, but also a reasonable and cooperative man. In my judgment, I expect to have a better understanding and better working relationship with him than with his predecessor. The first job he gave us is to prepare a day-long presentation on manned planetary missions. We will use essentially the same material now in preparation for you, tentatively for the week of November 4, on the subject: SATURN V vs. NOVA.

2. IN-HOUSE STUDY ON PLANETARY FLYBY'S

We have drafted our guidelines for this limited in-house study (approximately three man-years) on the question of what SATURN V has to offer in early manned planetary missions. As you requested, the guidelines are on their way to you for review. We would favor a management solution in which Aero-Astrodynamics Laboratory assumes chairmanship of this little working group. I think Dr. Geissler is willing to consider this. This in-house study should be completed in about six to eight months.

HHK
O.K. I write me!
B

3. PRODUCT IMPROVEMENT OF SATURN V

Last year we requested (and have received approval) $400,000 to study several major redesigns of SATURN stages, to improve the payload capability and cost effectiveness trends to make an even more attractive launch vehicle out of it. We are presently engaged in discussions with P&VE and Aero to draft a package plan of what should be studied and how. The most effective changes will be in the propulsion system area and, therefore, the center of gravity of this study activity will be in P&VE. We will forward our plan of attack to you (through Mr. Weidner) within the next two weeks, for review and approval.

NOTES 9-23-63 KUERS

B 9/25

1. Personnel: I have not chosen a new deputy for myself as a replacement of Mr. Trott and do not plan to fill this vacant position immediately. First, I want to see how the new organization will work. I have several possible candidates but I think I can get along for some time leaning on support by my staff members. ✓

2. Saturn V, S-IV Stage: After a thorough analysis of the K&T tape controlled skin mill loading problem we arrived at the following compromise solution:

a. Boeing agreed to transfer some of their commercial work (not all) from Wichita to Seattle. ✓

b. All the work for the T-vehicle will stay in Wichita. ✓

c. The overload for the S, D, and -1 vehicles will immediately be transferred to Seattle. Basically all container skin panels and sculptured gore segments will stay in Wichita while panels and other parts for the thrust structure will be made in Seattle. In this way we try to keep to a minimum the manufacturing of identical parts in two different places. ✓

d. A minor portion of our present peak load will be immediately sub-contracted to Republic Aviation Company, which company has agreed to accept this work. Their machines are completely compatible so that existing tapes can be utilized. ✓

e. The constant thickness gore segment milling work will be accomplished in Seattle on Giddings and Lewis milling machines which are not tape controlled. ✓

f. The cost of additional tooling for Seattle is estimated to amount to approximately $32,000--for the Saturn Program. This figure does not include cost of shipping containers which Boeing will absorb in their overhead cost. Since the rate of overhead cost at Seattle is somewhat higher than in Wichita Boeing assured us that the Wichita rate of overhead would be applied to our work. ✓

We have similar problems of machining skin panels at the West Coast with DAC and S&ID. These machining loads will undoubtedly increase in the future. As I had stated before 90% of these machines are owned by the Air Force. Their work load might also substantially increase with the production of the TFX planes. We initiated, therefore, a study of the total picture to analyze the possibility to buy one or two of tape controlled milling machines for the total Saturn program. Cost of one machine is approximately $600,000--delivery time 24 months. ✓

Study is most worthwhile B

3. Saturn V, S-II Stage: Mr. Bowden has established a committee to study, coordinate facility problems at Seal Beach. Committee Chairman is Mr. J. Halisky, ME Resident for S-II. The purpose of this committee is to determine manufacturing schedule impact, corrections required and to expedite necessary actions. ✓

B 9/25

NOTES 9-23-63 LANGE

1. SATURN I: S-I-9 - Re Notes 9-16-63 Lange (Attachment 1) - A review of TM requirements for static test and availability of non-flight hardware to meet this requirement has been made with M-ASTR, P&VE, TEST, & QUAL. ASTR has concluded to provide a TM system consisting of flight and non-flight hardware to be installed for pre-static checkout and static test, permitting S-I-9 to proceed on schedule. The booster will be released to M-QUAL on 10-1-63, and the TM components installed during the first week of pre-static checkout. The non-flight TM hardware will be replaced with flight hardware after static test prior to post static checkout. ✓

O.L. In view of the SII-B planning exercise I'd like to have a realistic* appraisal as soon as possible B

S-IV-5 - arrived at AMR via Pregnant Guppy on 9-21-63. ✓

S-IVB - During the Quarterly Review on 9-12-63, DAC indicated the Battleship and structural test stage activities were generally on schedule. This is not in agreement with PERT and other data available to MSFC which indicates these phases of the program are behind schedule. This situation is being further evaluated.

2. SATURN V: Performance Review will be held on 10-8-63 at MSFC. ✓

S-IC - Quarterly Review at MSFC has been rescheduled from 10-1-63 to 10-9/10-63. ✓

Gore Assembly Fixture - Re Notes 9-16-63 LANGE (Attachment 1) - in view of the involvement of Mason-Rust in the issuance and control of Welding and Burning permits, no Gov't action to prove negligence on the part of Boeing will be taken. ✓ Boeing with Mason-Rust has initiated additional enforcement proceedings to assure fire protection service at all locations where welding and cutting is being performed. Recommend no additional action on the part of the Gov't on this matter. ✓

S-II - Quarterly Review at MSFC has been rescheduled upon HQ's request from 10-1-63 to 10-14/15-63. ✓

FY-64 funding limitations will definitely cause a slippage in the S-II development schedule, however, delays caused by bulkhead problems and battleship facility activation will encompass the more severe slip caused by restricted funding.

S&ID has suggested several methods to decrease the dry stage weight of the S-II from 79,211 lbs. to 72,726 lbs. and the end boost weight from 94,004 lbs. to 82,984 lbs. ✓

3. APOLLO: MSC flight missions for SATURN IB were reported by Mardel as follows: SA-201/2 - Launch Environment (similar to SA-6); SA-203 - Spacecraft/launch vehicle separation; SA-204 - Spacecraft qualification (manning to be considered); SA-205 - Manned 14 day mission (no LEM); SA-206/7/8 - (LEM checkout, rendezvous, and docking). Payload weights are tight. ✓

Not unreasonable! B

Panel Review Board meeting of 9-25-63 has been postponed to 10-30-63 by Shea. ✓

Dr. Lange:
There is still to much abbreviation and short item without comment in these NOTES. JCM 9-23

B 9/17

NOTES 9-16-63 LANGE

1. SATURN I - SA-5 - S-I-5 and IU-5 work at AMR is proceeding satisfactorily. After successful post static checkout, the S-IV-5 was removed from the stand on 9-14-63. The estimated shipping date is still 9-20-63. ✓

Pregnant Guppy - Damage to the P. G. at L. A. International Airport on 9-11-63 has been repaired. The aircraft was operational again on 9-13-63. ✓

S-I-9 - The earliest estimated delivery date for certain ASTRIONICS components (TM packages) is February 1964, based on late procurement actions. It is our understanding that this date is contingent on sole source procurement being initiated immediately. This delivery will permit installation in time for a delayed checkout and subsequent operations to meet the "target" schedule but of course not the OMSF schedule. This will require that S-I-9 be stored after completion of assembly for approximately 3 1/2 months before checkout can begin. (Recommend not reporting this to Hqs pending further review.) ✓

O.L. Ast. gave us a very different story! B

2. SATURN V - S-IC - The problem concerning the requirements for intercommunications and closed circuit T.V. for stage checkout at Michoud and M-QUAL was resolved between MSFC and Boeing in meeting on 9-9-63. ✓

Gore Assembly Fixture - Re Notes 9-3-63 Lange (Attachment 1) - Fixture has been repaired at Wichita and is being returned to Michoud. Preliminary estimate is that no schedule impact will result from this damaged tool. Repair cost is about $9300. Unless the Gov't elects to prove negligence, NASA will have to pay the cost. ✓ O.L. ⇨ What do you recommend? B

S-II - Negotiations with S&ID for Amendment #5 are scheduled to start at MSFC on 9-24-63.

The use of substitute parts in the EMM and Battleship continues to be a major concern. The heavy influx of substitute hardware dilutes the confidence level and causes an increase in program cost. M-SAT has asked S&ID for a monthly status report on the use of substitute hardware so that MSFC can be fully cognizant and take corrective action when needed on an item by item basis. ✓

S-IVB - Quarterly Review was held on 9-12-63 at MSFC. Material presented by DAC is being evaluated. ✓

3. APOLLO - Preliminary Emergency Detection System for SATURN IB and V was reviewed by the Crew Safety Panel on 9-11-63. This specification will be released for design. ✓

Electrical Systems Integration Panel met at MSC on 9-12-63. - MSFC presented the General Specification for Cables for approval. ✓

An official ICD for SA-10 will be released by next Panel meeting. ✓

The Electrical Systems Integration Panel recommends to the Launch Operations Panel that the BP-13 umbilical arm retract no later than 15 seconds before ignition. ✓

Attachment 1.

NOTES 9-23-63 MAUS B 9/25

*1. MANPOWER DETERMINATION SYSTEM STUDY - We continue to receive pressure from NASA headquarters to provide personnel requirements justification that will withstand Bureau of Budget and Congressional scrutiny. Wherever possible, we are required to utilize work measurement techniques to determine manpower requirements.

Consequently, I have initiated a management study to locate, define, document, and hopefully improve such work measurement techniques as are used in the technical laboratories. Initially, we are reviewing with Propulsion and Vehicle Engineering Laboratory their newly established system for determining manpower requirements. ✓

2. REORGANIZATION ACTIVIATION - The functional statements which were prepared last week on the new organization structure were the best that could be done in the time available. We will utilize the next thirty days for a concerted effort to review and refine these statements. ✓

3. PROJECT SUPER (Support Programs for Extraterrestrial Research) Air Force System Command has submitted complete proposals including scope of work and cost data for the first four tasks being considered for accomplishment under Project SUPER. This includes a task submitted by Research Projects Division for Impact Studies and a task submitted by Aeroballistics Division, for Aerodynamics Instrumentation Research, both to be performed by AEDC-Tullahoma. Two additional tasks, Self Sealants, submitted by Special Assignments Office, and Thermal Control in Space, submitted by Research Projects Division, are to be performed by Wright-Patterson Air Force Base. ✓

These four proposals have been referred to the laboratories/divisions concerned for technical review and approval. ✓

H.M.
Please see to it that this doesn't bog down in bureaucratic difficulties.
I think we should use these first 4 tasks as "ice-breakers" to get this corporation into the AF established. It may be helpful and useful in 1000 days in the future!!
B

B 9/25

NOTES 9-23-63 MRAZEK

1. ROVER INTEGRATED SCHEDULE: Harry Finger has finally agreed to schedule a meeting to establish an overall ROVER Integrated Schedule. This meeting will be held at Germantown on 10-3-63, and will include the Government agencies involved in ROVER. A subsequent meeting will be required to complete coordination with the ROVER contractors.

2. NEW LIGHTWEIGHT ENGINE CABLING: MSFC accepted a new type cable, proposed by Rocketdyne, which will withstand temperatures up to 2,000°F for 400 seconds. The cable has a teflon covering with a silicone rubber overlay which is protected by a nickel-clad copper wire braid. It will be used on the J-2 engine of the S-II stage and will be routed from the engine-connect panel to the stage-mounted junction box, thereby eliminating the customer-connect panel.

The new cable is 100 pounds lighter per engine than the armored cable, resulting in a weight saving of 500 pounds on the S-II. Eliminating the five customer-connect panels and stage structural supports will lighten the stage 680 pounds, which amounts to 1,180 pounds of weight savings per stage.

WM Hope we can introduce it in the SIV B and SIC also. B (Fichtner was always against armored cable because of accessibility in case of repairs. How does he feel about this new cable?)

3. MSC PAYLOAD REQUIREMENT FOR SATURN I: (Reference NOTES 9-16-63 MRAZEK, paragraph 6.) A proposal to uprate the H-1 engines from 188,000 to 200,000 pounds is being studied by this laboratory. A cursory analysis of the effects of this uprating on payload capability for the Saturn I and Saturn IB launch vehicles has been made using only payload tradeoff factors. These studies indicate that a payload gain of 500 pounds on the Saturn I and 2,000 pounds on the Saturn IB is possible. Using payload changes, the following Saturn I and Saturn IB payloads result: !!

	Operational Saturn I	Saturn IB 204	Saturn IB 205	Saturn IB 206 & Sub.
Reference Payload Including Contingency	22,874 lbs.	31,432 lbs.	32,360 lbs.	32,684 lbs.
Payload	500+	2,000+	2,000+	2,000+
TOTAL PAYLOAD	23,374 lbs.	33,432 lbs.	34,360 lbs.	34,684 lbs.

4. MSC MINIMUM REQUIREMENT DISCUSSION: As was discussed in the weight-savings meeting, I had (Saturn Systems Office representatives participating) an informal discussion with Mr. Mardel, MSC, on the minimum requirement. This includes 1,500 pounds of propellant in the service module for de-orbiting. Any addition of fuel will allow them to perform orbital maneuvers, which they would very much like to do.

5. RL10 ENGINE: Significant recent developments: (a) Fifteen engine system tests have been completed using hypergolic ignition; (b) Thrust levels of 20,500 pounds were reached for durations of two minutes in several firings; (c) One engine completed 123 firings (three hours firing time) without adjustment or parts replacement; (d) Tests of improved atomizers for the injector have indicated that Isp can be improved five to eight seconds; (e) Engine vibration testing and high frequency gimbaling tests have been completed; (f) One test stand has been modified to provide accurate space simulation during all modes of engine operation; (g) New igniter has been developed which will spark when wet; (h) Satisfactory cooldown has been demonstrated with interstage nitrogen purge.

Attachment #1: NOTES 9-16-63 MRAZEK

B 9/25

NOTES 9/23/63 RUDOLPH

No Notes

NOTES - 9-23-63 - SHEPHERD B 9/25

1. General Accounting Office (GAO): Representatives of the GAO began an audit of construction activities at Huntsville on June 10, 1963. This audit was broken into two phases; (1) an audit of our A-E contracts, and, (2) an audit of the construction contracts. Preliminary exit interviews were recently held with GAO on both audits. Several minor discrepancies were noted by the audit team. However, by and large, a very favorable report was made. The final report is expected in approximately two weeks.

2. UGF: The first four days of the UGF Campaign got off to a very good start with a total pledged amount of $30,570, as compared to $18,000 pledged during the first week of last year's campaign. The increase over last year's pledge can be contributed to two things; (1) increase in personnel, (2) indications that we may exceed last year's rate of contributions.

3. S-IVB: Funding difficulties exist for the S-IVB Test Stand construction at Sacramento. We are short because of: (1) new and increased requirements, (2) deletion by Headquarters of the third test stand from the FY-64 budget, and, (3) a low original estimate of the total project. The problem is two-fold; first is to obtain sufficient funds to award the construction contract for the Gamma Complex; and second, to provide for adequate contingencies and the operating costs of the Corps of Engineers. OMSF has been notified and are working on a method whereby a funding realignment may be made to satisfactorily solve this problem. We expect to receive authority to award the Gamma Complex by Wednesday of this week.

4. Mr. Long: Robert Long has scheduled a meeting at Houston this week to discuss the general NASA facilities Management with representatives of all Centers of NASA. I plan to attend this meeting, at which time I believe we can obtain better understanding of Mr. Long's role and relationship with the Centers and OMSF.

NOTES 9-23-63 Stuhlinger

B 9/25

1. STATUS OF RADIATION EFFECTS ON METEOROID SENSOR: The data obtained in the experiments at Chance Vought is sufficient to indicate an extremely high probability of a solution to the radiation problem. Additional tests will be required to verify the results of the test run during the past three days; however, at the present time it appears that a reasonably satisfactory solution to the problem is at hand.

2. FY-64 OART SUPPORTING RESEARCH: A total of $600,000 has been committed to date against the FY-64 OART SRT program. Budget estimates were prepared for each MSFC Laboratory through FY-1970, based on guidelines furnished by OART, OMSF, and OSS. They were broken down to the sub-program level for the fiscal years 1964 and 1965, and to the program level for the years FY 1966 through 1970.

No program authority has yet been received for FY-64 from OMSF.

3. RADIATION CALCULATIONS: Mr. Henry Stern recently visited General Dynamics, Fort Worth, to complete the final checkout of a machine code to be used for predicting the radiation environment in RIFT and nuclear-electric propulsion configurations.

Mr. Martin Burrell has completed some in-house codes for electron number and energy deposition for aluminum. This data will be used in estimating electron damage in mylar capacitors used in the meteoroid measuring satellite.

4. LOW-VELOCITY PARTICLES AT HIGH ALTITUDES: In Major R. W. Bollinger's report on our trip to Air Force Bases, you asked for information on "low velocity particles" found in the Venus Fly Trap experiment on an Aerobee rocket. Dozens of micron sized spherical, irregular, or fluffy particles were found on clean surfaces after the recovery. After careful analysis, the experimenters believe that these particles a) are extraterrestrial; b) are suspended, slowly settling, or trapped in orbits at altitudes between 80 and 160 km; c) have velocities relative to the Aerobee rocket of less than 1 or 2 km sec^{-1}. It is not known why no particles with greater velocities were observed. Our meteoroid satellite will not record particles of such small sizes and low velocities.

5. SEISMOGRAPHIC STUDIES: Dr. Ilmars Dalins of RPL has begun to work with Dr. Sieber of Test Laboratory on the ground tremors associated with Saturn testing.

6. LUNAR-SYMPOSIUM: On September 11, I presented the first of a series of nine symposia on the Physics of the Moon. The subjects of this lecture were Genesis of the Moon, Lunar Data, and Topographic Features. Approximately 100 people attended. Later subjects will include lunar environment, lunar physics, lunar exploration requirements and problems, etc. Would you like to be informed of future lectures?

→ Yes, very

E.S. unfortunately, I couldn't attend yours.

B

September 30, 1963

NOTES TO MUELLER - 10-1-63 - DEBUS

1. Inclement Weather Effects. Extremely heavy rains and high winds hit the area last week and affected us as follows:

a. SA-5 Operations. Checkout delays have occurred. We are approximately three days behind published schedule; expect to be back on schedule prior to October 11 (presently planned, S-IV, mate-date). The overall vehicle schedule was rearranged to meet the forecast launch date.

b. Complex 37. All construction work stopped Monday through Wednesday.

c. Merritt Island Industrial Area Construction. All work except minor interior work has been shut down since September 19. It will be a week to ten days after the rains stop before any appreciable work can be accomplished on the installation of utilities.

d. Foundations for VAB. Only 3,000 linear feet of piling have been driven since September 19, for a total of 223,000 l.f. of the required 674,000. Virtually all work has been shut down since September 19. After the rains stop, it will take approximately three days to remove the excessive amount of "fill" washed into the foundation area. No concrete has been poured during the past week.

e. Apollo Office Building. All operations were extensively interrupted during the period because of leakage encountered in the walls and windows of the Apollo Office Building.

3. SA-5 Checkout. Leakage was found in the hydrogen chilldown duct system of the S-I stage. The leakage was isolated to that portion of the system which is an integral part of the stub fin #4. The exact origin of the leak cannot be determined without removal of the fin. A course of action was established with MSFC personnel which requires removal of the fin to establish the origin of the leak.

A spare fin is being prepared in the event the rework will require a long period of time, which could affect the schedule.

4. Relays in the S-IV Stage. During the DAC quality testing program, the GE relays used in the S-IV sequencer and Propulsion Unit (PU) failed. It was decided by MSFC and DAC that this type relay would have to be replaced in all flight computers. It was verified during receiving inspection that these relays had not been replaced. Corrective action (by DAC/MSFC) is being taken.

5. S-IV Hangar Operations. Following arrival of the S-IV stage on Saturday (Sep. 21), modifications were begun as scheduled to meet a "mate-date" of October 11. However, due to late receipt of detailed change information from DAC/SM, the hangar schedule is presently behind this schedule. It is probably too early to state that the S-IV cannot meet the milestone "mate-date"; however, LOC systems engineers are pessimistic at this time. A further delay of the mate will very likely delay the planned launch date.

6. SA-5 Range Documentation. All known program and operational requirements for total DOD support of SA-5 have been submitted to the AMR following the Lead-Range concept.

7. SATURN SA-5 (Booster Impact Shipping Hazard). Regarding comments in my notes of 9-24-63, the following steps have been taken:

a. Researched what information was available on SA-1 and SA-4 which constitute similar cases. On SA-1, special film is available--taken from planes observing the incoming debris. However, it is not possible to distinguish between metal pieces and whitecaps on the water. For SA-4, the pilot of one of the planes reported observation of booster reentry and breakup, but no photographic evidence is available.

b. MSFC informed us that no booster breakup study has been made, but they are confident that breakup will occur since the SATURN Block II vehicles are built using somewhat lighter material than the Block I vehicles.

c. Even in the very unlikely case that an entire tank of the S-I cluster would float in the impact area, this should not be considered a shipping hazard since no small craft can be expected in the impact area.

d. LOC will enter a special requirement in the Operational Requirement (OR) that appropriate observation of the reentering vehicle parts shall be recorded. The A3D's of the Heavy Photographic Squadron (Navy) will attempt to photograph, and AFMTC ships will be required to be in the area to observe debris.

8. Modifications to Engine Removal Platform, LC 34. All hardware for the modifications of the engine removal platform for Block II vehicles at LC 34 was shipped on September 18, 1963 by Hayes, Birmingham, Alabama, to Cape Canaveral. The modifications were made to provide spark-proofing in accordance with specifications.

9. Standard Computer Programming. Personnel of LOC attended a Saturn V Computer Programming meeting of Automation Sub-Board 4. Each contractor presented his approach to the programming problem, and MSFC/LOC presented the NASA plan. It appears there are merits in both the NASA Acceptance Test or Launch Language (Atoll) plan and the DAC Saturn Test Oriented Language (Stol) which should be weighed objectively in deciding on the ultimate standard language. Further discussions of the various proposals are planned

10. GE - Quality Control. A meeting was held with GE Material QC regarding results of survey in the receiving department. Major deficiencies discussed were the lack of inspection instructions for GE inspectors and the lack of procedures for the handling of incoming Government-furnished property. These items will be followed for corrective action.

11. MILA Base Communications O&M Contract. The Source Evaluation Board was convened 23, 34, and 25 September 1963 at LOC. During this time the evaluation was completed of the 14 proposals submitted for the MILA Base Communications O&M Contract, and the proposals were ranked in their relative order of merit. The Chairman and Recorder are now in the process of preparing the final report to be sent to the Administrator. Al Siepert is attempting to schedule a briefing by the Board Chairman to the Administrator as soon after Wednesday of this week as feasible. We are still working against a target date of October 16 for award of contract.

12. Administrative Communications on MILA. Southern Bell is still reviewing the draft contract for the Administrative communications on MILA. We have not yet received their comments.

13. Secretary of Labor Hearing on the Railroad Strike. Representatives of the Special Investigation Board established by the President, consisting of Mr. James J. Reynold, Assistant Secretary of Labor; Mr. Mack Gentry, Special Assistant to Mr. Reynold; Mr. Stephen Shulman, Assistant Secretary of Defense, Mr. Walter L. Lingle and Mr. Earl D. Hilburn, NASA Headquarters, arrived yesterday and toured the railroad spur and other construction now in progress by helicopter. Today they are holding hearings at the Cape Colony.

14. Operation and Maintenance of JetStar, Lockheed Aircraft Service Co. GAO informed NASA that the protest was denied.

15. Bridge Cranes, VAB. * Awarded to Colby Crane Company, Seattle, Washington, September 23 in the amount of $2, 179, 000.

16. Labor Strike. Craft Unions have walked out on Complexes 34 and 37. Dispute was over Douglas technicians installing tubing on umbilical tower. Douglas has been stopped on their work to get the Crafts back on the job. Mr. Styles and Mr. Miraglia are attempting to resolve the dispute. Meanwhile, all the parties are back on the job.

*Follow-on item

B 11/2

NOTES 9/30/63 CONSTAN

Negative Report

NOTES 9/30/63 DAVIS B 10/2

No notes.

NOTES 9-30-63 GRAU B1612

1. S-I-6 POST-STATIC CHECKOUT: Instrumentation and Telemeter Calibrations have been completed on S-I-6. Simulated Plug-Drop Test was performed with satisfactory results. Preparations are underway for the Simulated Flight Test.

2. S-IU-6 FINAL CHECKOUT: G&C Systems testing on the ST-90S has been completed and preparations are being made to run the Control Overall Test.

3. S-IV-5 VEHICLE STATUS: Vehicle S-IV-5 was transferred to AMR on September 20, 1963. Representative from this laboratory performing receiving inspection found two significant discrepancies which occurred in transit. Bonding of an electrical cable separated for approximately two feet along the H_2 tank, and a H_2 vent valve was found to be damaged. A discrepancy listed as a dent in the aft innerstage skin was found to be a puncture. A modification period of approximately three weeks will be required to perform twenty-six A.O.'s (work orders) and clean-up discrepancies. Erection and mating of S-IV-5 is tentatively scheduled for October 11, 1963.

4. S-IV VERTICAL CHECKOUT AREA, SANTA MONICA: Work is progressing rapidly on the buildup of the Vertical Checkout Area, Santa Monica. Installation of GSE is expected to begin immediately, and completion of the area is expected by October 11, 1963.

5. S-IV PARTS QUALIFICATION PROGRAM: Test Engineers from this laboratory have been located within Douglas Aircraft Company's environmental test facilities at Santa Monica, California. These engineers make daily written reports on the validity, completeness and results of the S-IV parts qualification program. The reports are datafaxed to MSFC for distribution to cognizant project and design engineers.

6. DOUGLAS IDENTIFICATION-TRACEABILITY PROGRAM: Personnel from this laboratory met with representatives of Douglas Aircraft Company to develop an acceptable identification-traceability document. Douglas personnel agreed with a document that will, in their estimation, eliminate more than three-fourths of the original scope change cost of $4,617,000. This document is being processed for submittal to the contractor through the Saturn Systems Office.

7. RE-QUALIFICATION PROGRAM: We have initiated a limited program of re-qualification of flight parts carried in the MSFC supply system. This effort, at present, includes re-qualification of two (2) sets of resistors and one set of relays. Result to date is the detection of sub-standard resistors in the supply system. Action has been initiated to remove these resistors from stock and the manufacturer has been notified to take corrective action.

NOTES 9-30-63 FORTUNE B 11/2

1. Equal Employment Opportunity Considerations: Reference NOTES 9-3-63 FORTUNE, copy attached. Under Civil Service regulations, it is not feasible for us to arrange brush-up courses in colleges for applicants. However, we have had two male applicants this past week who possibly will be certified eligible by the Civil Service Board. Dr. Frank Albert from MSFC Personnel Office and Bill Winterstein, MTO, will visit Xavier and Dillard Universities in the near future to determine their courses and what sort of positions their graduates and students might qualify for.

2. GE Personnel Build-Up: After discussing this subject with NASA Headquarters personnel, I believe our basic figures as negotiated with GE for plant and test support are still sound. There may be some need for augmentation in the activation study and GE should now be preparing to undertake Phases 2 and 3 of the Technical Systems Procurement. I shall get together with Bill Davis on this within the next day or so. ✓

→ Bill F.

I had a talk with Harry Gorman about this problem. Suggest you discuss it with him and get his views

B

WEEKLY NOTES 9/30/63 GEISSLER B10/2

1. FY-65 C of F Program: (a) Special Fluid Mechanics Laboratory - Attached are items from my notes of 7/29/63, 8/5/63, and 8/12/63 which outline recent developments in our efforts to obtain a Fluid Mechanics Facility. Also attached is memo which outlines action taken by OMSF on MSFC C of F Program. We have been dropped to priority #9 by OMSF but even more disturbing is that they have included our project in the Technical Support or Institutional Support Group rather than the Saturn Support Group. I feel very strongly that our facility is required for Saturn V Program and would like to send a letter over your signature to OMSF stating our position. I feel that unless our facility is included with the Saturn Support items, we have no chance for approval. (b) Office Building - I also note that our office building is not included in the FY-65 program, but that a new building for Research Projects Laboratory and another extension to the P&VE Office building complex are included. As you know, we presently have people in Buildings 4200, 4481, and the Quick Building downtown. Since it appears that we will soon be the only Laboratory without a "home", I strongly request your support in having Building 4201 assigned to Aero-Astrodynamics Laboratory. → Dave Newby Please see me on this. - I gave Mr. Newby a copy. BK

2. Saturn I-B/Centaur/Voyager: Reference: Dr. Hueter's notes of 9/23/63, copy attached. It is felt that caution should be exercised in using any of the referenced numbers comparing Saturn I-B/S-VI to Saturn I-B/Centaur for the Voyager Mission until the final comparison of these two vehicles is presented to you on October 7th. There are very many intricate details involved that qualify some of the results obtained so far. We are faced with the perennial problem here of making sure that real apples and apples are compared and not apples and oranges. The Laboratories are making an effort in this direction and will present it to you as scheduled.

3. Optical Visibility of SA-5 in Orbit: Re: Notes Geissler 8/26/63. For reasons of temperature control (minitrack beacon) the nose cone of SA-5 will be painted black. This will reduce the expected maximum stellar magnitude from the values given earlier to -1.3 at perigee and to +0.9 at apogee.

4. Rift Stage Altitude Simulation Facility: Re: Your comment on Notes 9/16/63 Geissler, copy attached. Aero-Astrodynamics Lab has made a general study of the Lockheed proposal for RIFT stage facility to be constructed at NDRS, Jackass Flats, Nevada. While the overall proposal looks reasonable, there are certain facets which appear to be unique and require further study. Therefore, it was recommended to Facilities Engineering Office that model flow tests be conducted before this idea is pursued further. Your recommendation that we discuss an ablative nozzle or nozzle extension with Mr. Weidner has been pursued. An ablative nozzle or nozzle extension was used in J-2 engine tests in an attempt to alleviate starting side-load problems. Both an ablative extension and water-cooled extension were used. These extensions merely caused the nozzle to flow full and therefore prevented side-loads caused by separation. This possibility will be discussed with Facilities Engineering Office. Though, for safety reasons, it appears that a rather long duct will be required in this test facility. In this case it will probably be more feasible to use water-cooled duct.

E.G. I'll be glad to sign it, provided you can demonstrate why (as they may reason) it doesn't come too late to be of possible value for Sat V. B

fw 9/30

B 10/2

NOTES 9-30-63 GRUENE

1. Wind Limitations: To conclude the wind limitation notes on SA-5 on Pad 37, the following was decided in a meeting with P&VE, Aeroballistics, and LVO.

O.K. B

a. By slightly lowering the safety factor for unmanned Saturn I flights during pad operations, the old 99.9% criteria is re-established. ✓

b. Whenever Saturn I vehicles would be manned, pressurization of the tanks and the connected modifications would be required. ✓

*fw 2. SA-5 Schedule:

a. The tremendous rains of last week stopped us from working on SA-5. Two of the three days lost were made up utilizing the last week end. We hope to be on schedule again prior to the presently planned mating date with the S-IV stage on October 11. ✓

b. Leakage was found in the hydrogen chill down duct system. A new stub fin with the duct taken from SA-6 was shipped to the Cape for replacement. The original SA-5 duct goes back to the manufacturer for repair. ✓

NOTES 9/30/63 HAEUSSERMANN

1. STUDY OF SATURN V CHECKOUT SYSTEM: Meeting was held with our G&C Division, Systems Engineering Office, and representatives of Bellcomm, Inc. This was the first meeting of the study group formed to study the adequacy of the Saturn V checkout system. It was agreed that no computer on the market has the reliability desired for this job. No other conclusions were reached. Bellcomm failed to show any justification for their past statements that the RCA-110A is inadequate for the job to be done in the LCC. They also failed to provide an alternate scheme to justify their contention that a computer on the LUT is not needed. The next meeting will be held 10/3/63.

2. STATUS REPORT - VEHICLE INSTRUMENTATION WORKING GROUP: A working group meeting was held between MSFC and Fairchild Stratos Corporation on the Micrometeoroid Measurement Capsule (MMC) for SA-8 and SA-9 on 9/13 at MSFC. None of the action items are critical or impair the schedule. FSC's command system seemed to be the weakest spot in their instrumentation. MSFC offered support if more information is made available to us.

3. STATUS OF PROCUREMENT PLANS SUBMITTED TO HEADQUARTERS: According to Mr. J. Nicholas, MLV, the procurement plan for the advanced computer and data adapter have passed Seamans and are in Dryden's and Webb's office for approval. The procurement plan for the IU integration and checkout has been returned from Seamans to Dr. Mueller for unknown reasons. Dr. Mueller stated in a telephone conversation today that he had sent the plan back to Seamans, again requesting approval.

→ Meanwhile approved!

NOTES 9/30/63 HEIMBURG

1. MARINE ACTIVITIES:

Barges PROMISE and PALAEMON are in port for routine maintenance. NOTE: Neither vessel will be open to visitors from 9/30 to 10/4.

2. Chrysler Corporation has successfully conducted loading, securing, and unloading of the S-IC transporter on the PROMISE.

2. ACOUSTIC DATA FACILITY:

A new General Electric 225 Data Processing System, replacing the Autonetics Recomp III System (used since November 1961), is in use to analyze acoustic and atmospheric data from MSFC and MTO.

Better data resolution is afforded with this system, due primarily to the reduction in time required to plot a set of atmospheric acoustic data. This permits utilization of the full measurement accuracy of the meteorological data. Examples of data plotted with the old and new system are attached for your information.

3. THRUST AUGMENTATION CLUSTER:

The thrust augmentation cluster (twelve 500-pound-thrust engines in a circle), designed and fabricated by Propulsion & Vehicle Engineering Laboratory, has been successfully tested at Components Test Facility and is ready for shipment to Tullahoma for tunnel tests. Successful firings of engine groups (three, six, and twelve) were accomplished. Three 30-second and one 45-second test were conducted on all twelve engines.

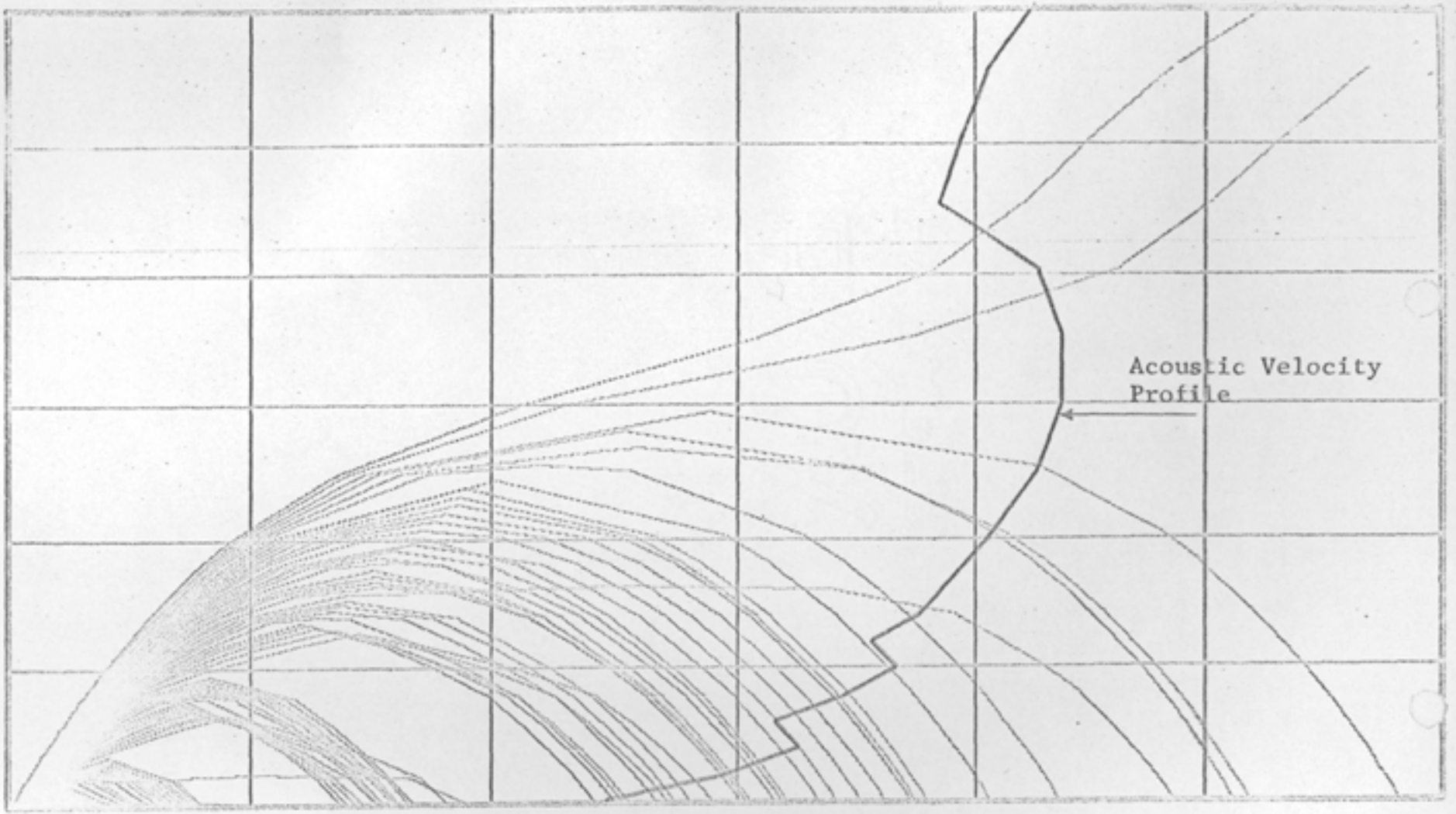
Photographs of the test setup and hot firings are attached for your information.

4. S-I-7:

Preparation of S-I-7 for static testing is proceeding on schedule. The initial 30-second run is scheduled for tomorrow, Tuesday, 10/1.

ATTACHMENTS

ATTACHMENT TO NOTES 9/30/63, HEIMBURG



RANGE (KM) 5 10 15 20 25 30

RANGE (10 FT.) 20 30 40 50 60 70 80 90

PROFILE (MPS) — 330 335 340 345 350 355 360 365 370 375

☐ MTF
☒ MSFC

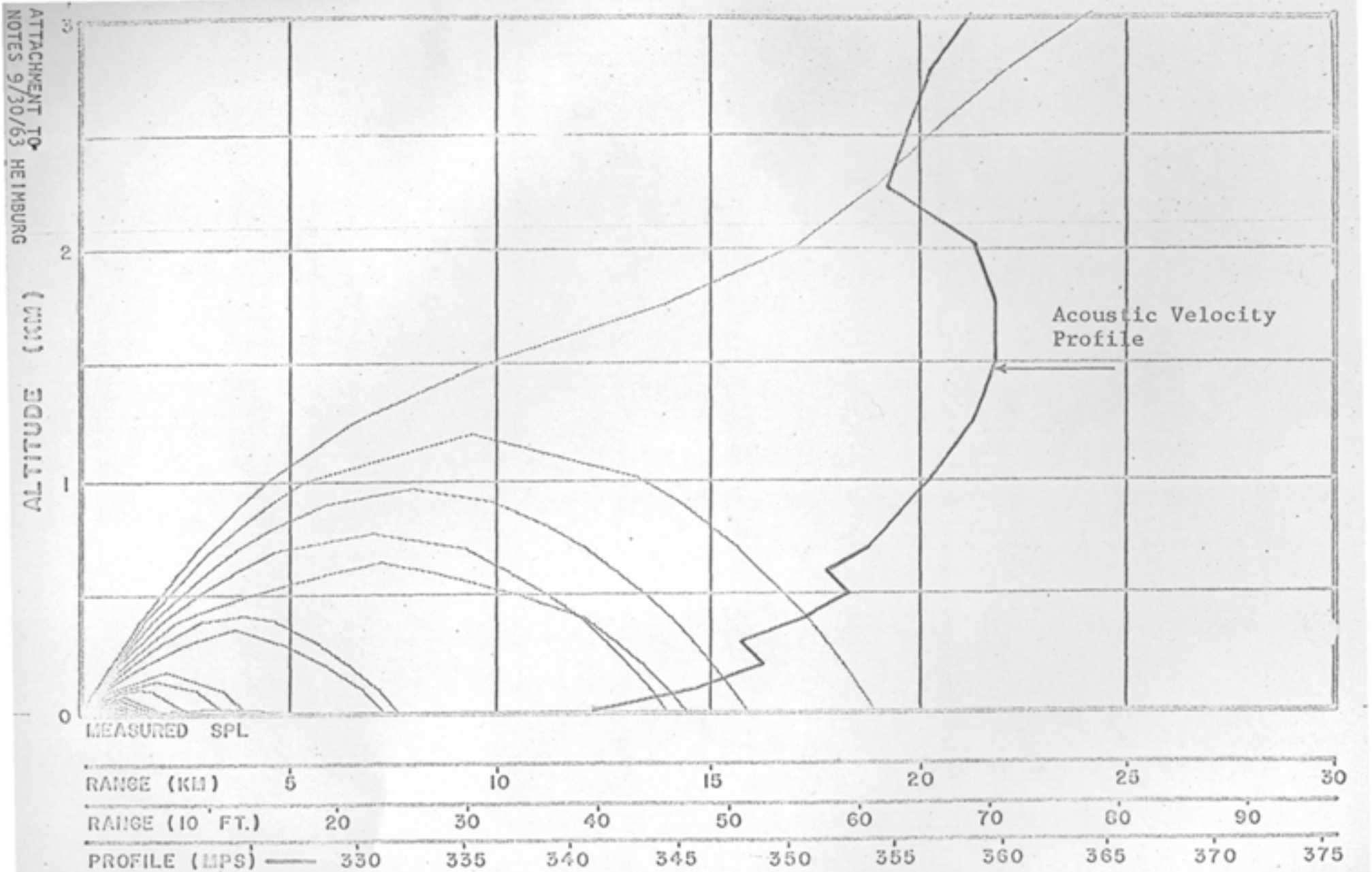
CALCULATED ACOUSTIC RAY PATHS

AZ 45°

DATE 20 Dec. 1960
TIME 1640 CST

Acoustic rays at 0.1° elevation increments
Plotted by GE 225 System (new)

ATTACHMENT TO NOTES 9/30/63 HEIMBURG



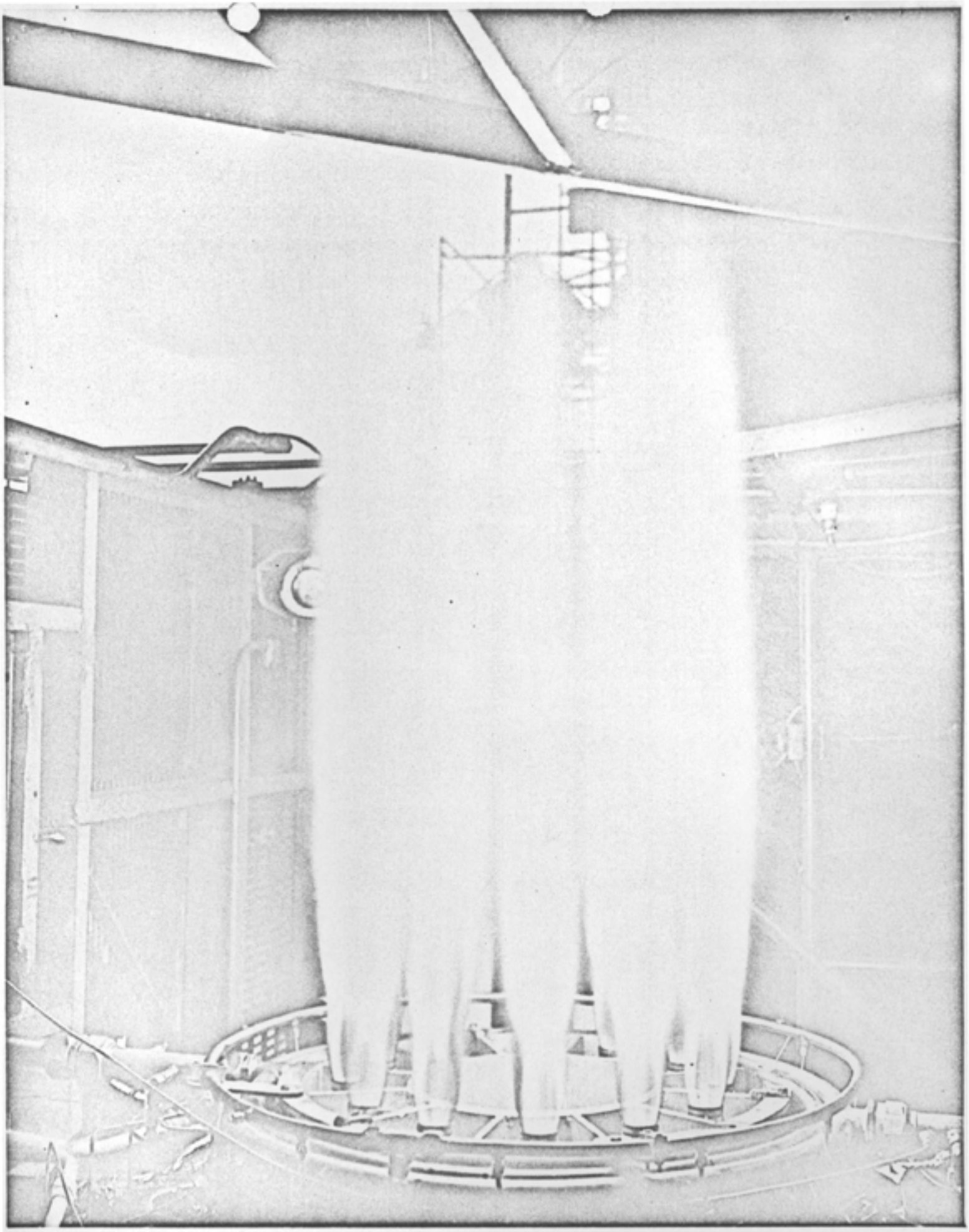
☐ MTF
☒ MSFC

CALCULATED ACOUSTIC RAY PATHS

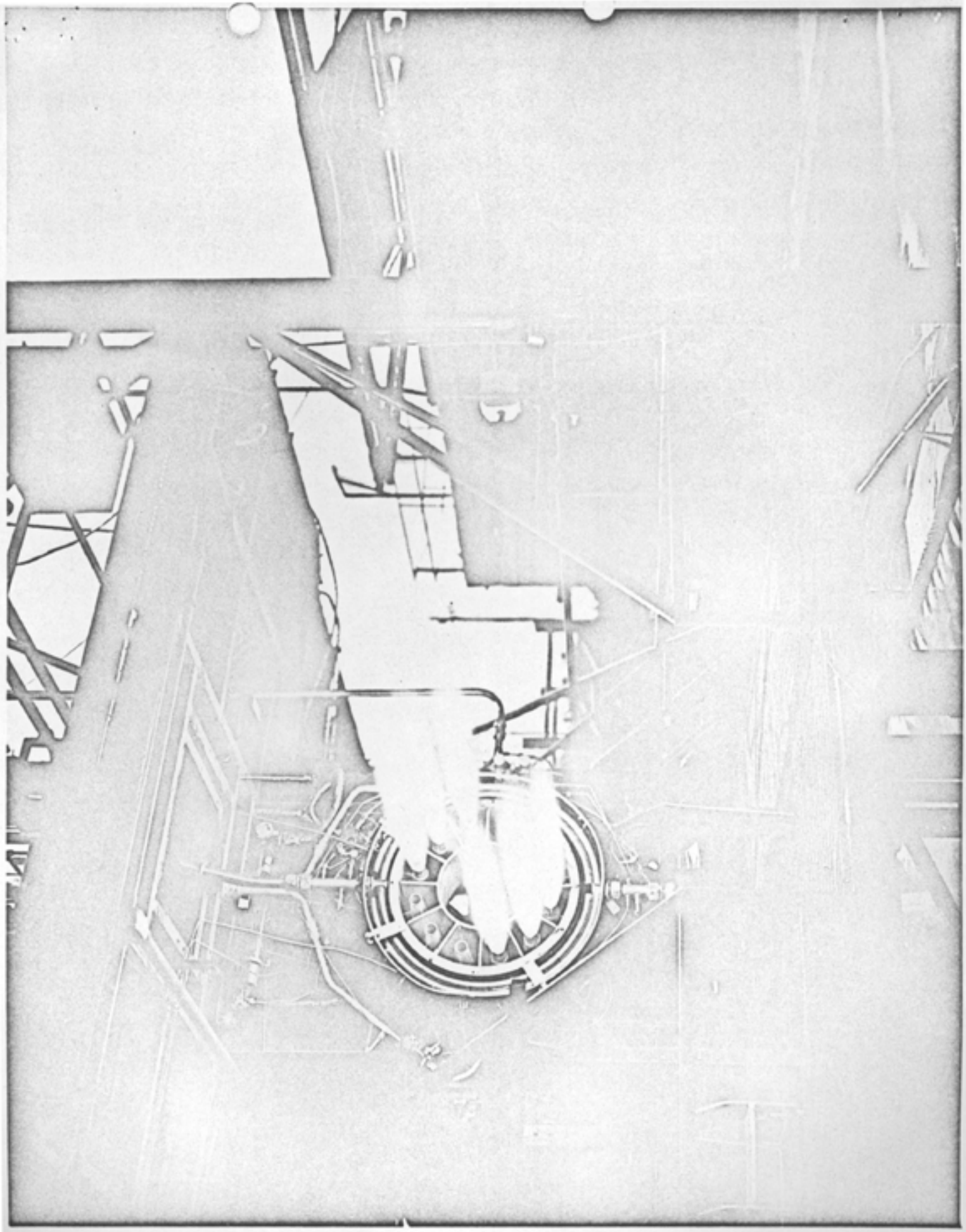
AZ 45°

Acoustic rays at 1.0° elevation increments
Plotted by Recomp III System (012)

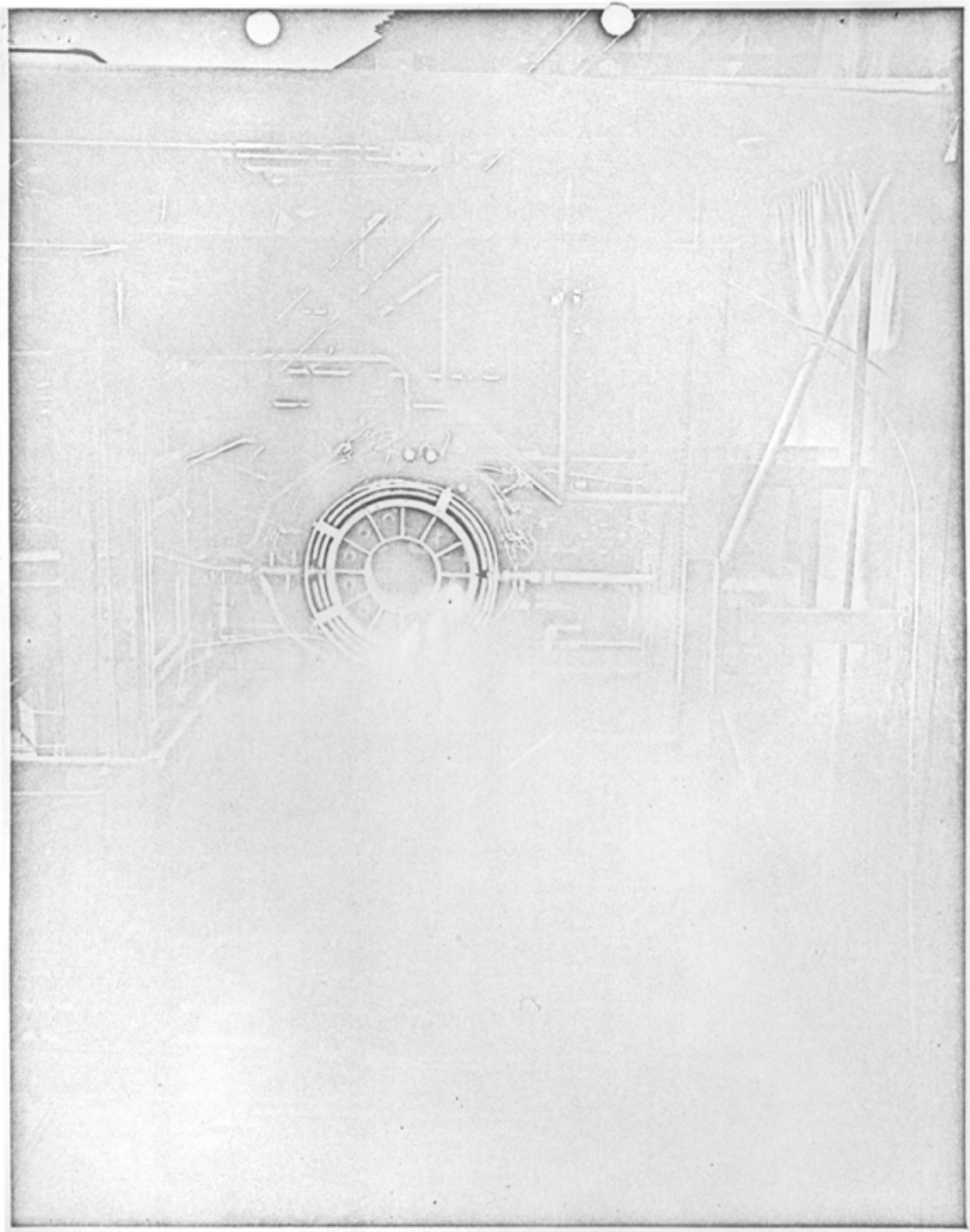
DATE 20 Dec. 1960
TIME 1640 CST



ATTACHMENT TO NOTES 9/30/63 HELMBURG



ATTACHMENT TO NOTES 9.30/63 HELMBURG



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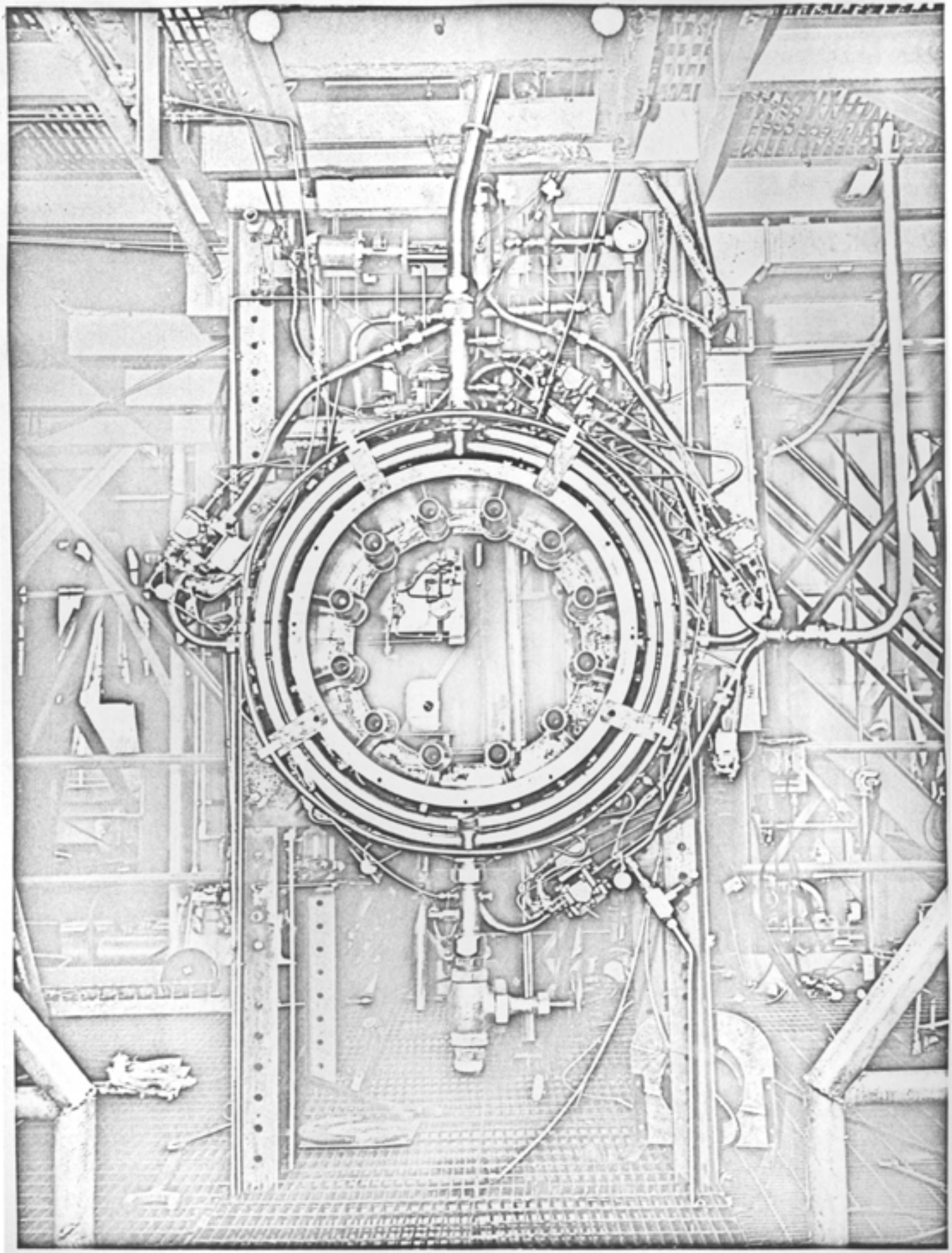
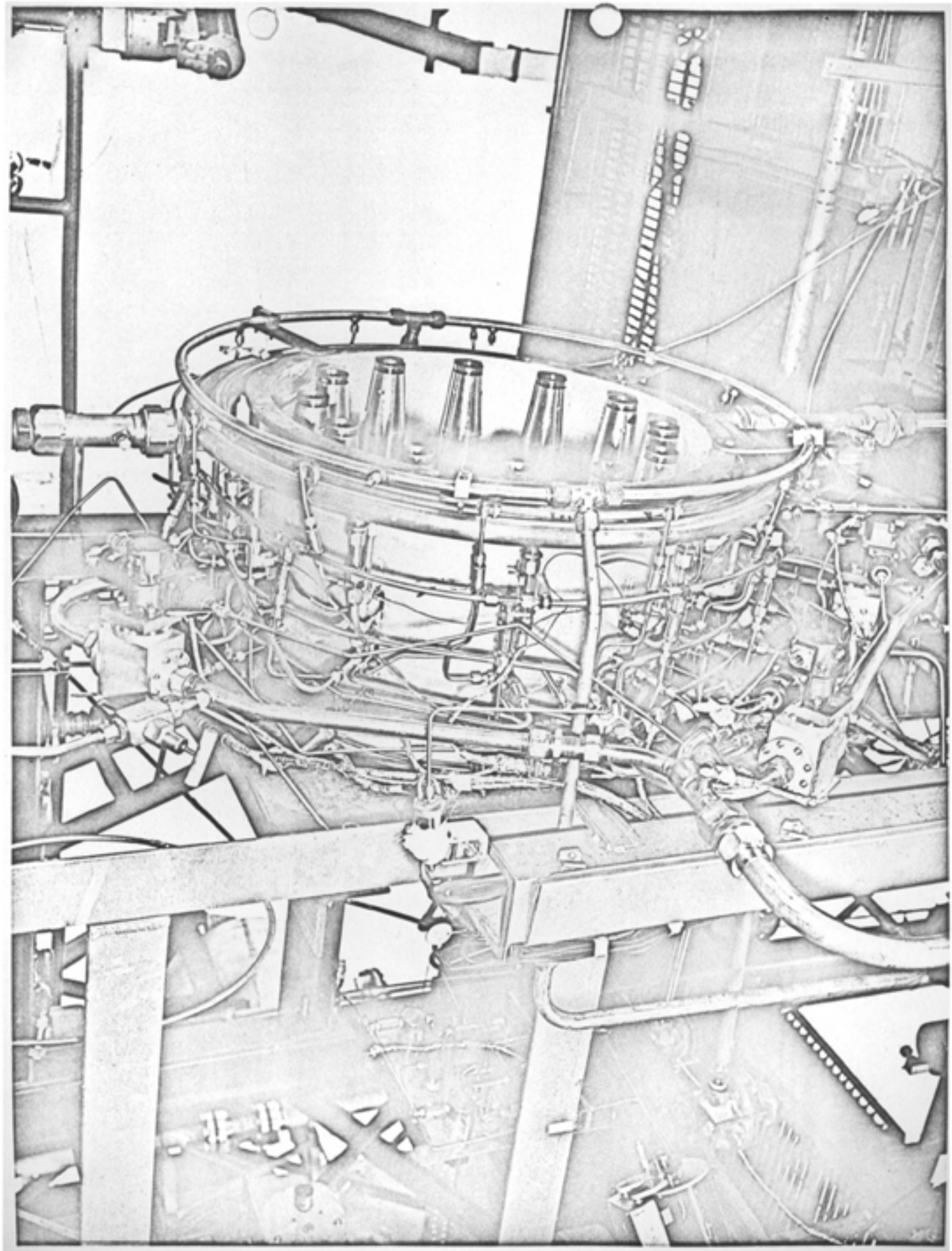


ATTACHMENT TO NOTES 9/30/63 HEIMBURG



ATTACHMENT TO NOTES 9/30/63 HEIMBURG

B 10/2

NOTES 9-30-63 HOELZER

1. SUPPORT OF LOC IN COMPUTER PLANNING: This Laboratory is continuing to work with LOC (Sendler) in planning the computer facility which will be installed in the Central Instrumentation Facility, MILA. Specifications have been written and will be given to manufacturers when the budget situation for FY-64 is resolved. It is planned that procurement will be made from Huntsville and that LOC will be given technical and administrative support in establishing and implementing this facility in line with the agreement signed by you and Dr. Debus. The situation seems to be most satisfactory from the standpoint of both LOC and this Laboratory. ✓✓

2. MERIT STEP INCREASE: When will a local procedure be put into effect implementing the NASA Headquarters permission to grant merit step increases to our people? We have had one in the mill on Mr. Fortenberry for several weeks and so far no action has been taken.

H.A. Have signed authorizations about 3 days ago. B

NOTES 9-30-63 HUETER B 10/2

1. GENERAL: Responsibilities for missions heretofore assigned to Special Assignments Office are to be transferred to Mr. deFries, M-AERO, October 1. These functions (Apollo Lunar Support System and the Multiple Mission Module) will, in the future, be reported by Mr. deFries.

Disposition of Special Assignments Office personnel has been, with a few exceptions, firmed up as to assignments to either R&D or Industrial Operations. Specific assignments within these two organizations have not been resolved. For Monday 7.7. B

2. MULTIPLE MISSION MODULE: On September 26, we were informed by Mr. Salmanson, OSS, that the MMM had been removed from the OMSF secondary budget for FY 65. Substituted for this were Apollo overruns and a manned space station.

3. SATURN IB/CENTAUR/VOYAGER STUDY: Schedules of events for the Centaur Study are as follows:

a. October 1 - Dry Run for the Centaur Presentation to Dr. von Braun. Division comments will be integrated into the STL Technical Presentation, if practical.

b. October 2 - Centaur Study Presentation to Dr. von Braun.

c. October 7 - S-VI/Centaur Comparison Study to Dr. von Braun. The Division comments that could not be integrated into the STL Technical Presentation on October 1 will be presented at this time.

d. Centaur Study Presentation to NASA Headquarters is indefinite at this time as to date and type of presentation desired.

NOTES 9-30-63 Koelle

B 10/2

1. COST STUDIES

We are continuing, within our limited authority and capabilities, to study the reasons for cost overruns and to develop tools for better cost projections. We are coordinating this activity with those individuals from other organizational elements of MSFC who have demonstrated an interest.

Our activities can be summarized as follows:

The immediate objectives for the next 12 months are organized into five individual packages:

a. Resources Model: This will give us upper and lower limits of expected funds to be available for the development, procurement, and operation of present and new launch vehicles. The lead office to develop this model is the Executive Office (Jack Waite and crew) with the assistance of FPO. ✓

b. Mission Model: This mission model relates the mission capabilities of individual launch vehicles with mission objectives, state-of-the-art, and initial weight requirements in low altitude orbit, with the main variable being change of emphasis on space activities between global operations, orbital operations, lunar operations and planetary operations. We are trying to interest Aero-Astrodynamics Lab (H. Thomae) in assisting us in the development of this model. ✓

H.H.K.
I suggest you also study (and possibly crank in):
- Cadle report (blue book)
- Shriever "lessons" report (yellow book)
Maus knows both and can get them for you B

c. Cost Projection Model for SATURN-type Expendable Launch Vehicles: This model is in an advanced state of development. We will attempt - in close cooperation with Industrial Operations - to mechanize the process of cost projections. However, this model will not substitute for the detailed budget exercise we have to make several times per year to cover the immediate future. It will give long range trends and permit an evaluation of the influence of the major system parameters. This model will have a great deal of sophistication and hopefully will help us to better understand some of the cost parameters and to develop correction factors for overruns. ✓

d. Universal Cost Model for Launch Vehicles: This is a more advanced cost estimating procedure for reusable launch vehicles, which we are developing under contract with Lockheed and General Dynamics/Fort Worth, and with some assistance from RAND. ✓

e. Cost Effectiveness of National Booster Program: We do have now an operational program, which allows us to mix firing rates and performance of all the launch vehicles, which are presently in the national booster program. This model helps us to analyze the influence of either individual launch vehicles on the total program, or the effect of individual vehicle improvements. This will be helpful for SATURN V and NOVA comparisons. ✓

B 1014

NOTES 9-30-63 KUERS

1. Saturn V, S-IC Stage:

a. Ring baffle installation on the fuel test container is now proceeding after a hold-up of more than 3 weeks because of lack of parts manufactured in Seattle. Some parts have still not been shipped.

b. A weld porosity problem on the horizontal weld joint of Y-ring to dome has troubled us for a long time. A solution has been found by welding 2 passes and by slowing down the welding from 5 to 3.5"/min. This is on very low weld speed. However, we have good weld strength of 39,000 psi and almost no porosity. We are working to improve this process. With this method we succeeded in welding the lower fuel bulkhead to its Y-ring successfully with only one porosity repair on the second pass.

c. Welding of outlet fitting into gore segments for the first bulkhead for the T-vehicle has now been started-14 weeks later than scheduled. Two of the outlets (out of 20) have still not been delivered to us from Boeing Wichita and Michoud.

d. Arrowhead has announced that preflight certification testing of pressure volume compensators for lox and fuel feed lines has slipped by 2 months and is not expected to be completed before March 1, 1964. Delivery of S-IC-T hardware will meet present assembly schedules.

2. Personnel: Mr. J. Orr, formerly one of our ME Resident Engineers at Los Angeles, has now taken over our Manufacturing Research and Technology Division. Before he had joined MSFC last year he had a similar position at the Ryan Company.

3. Facilities: Construction of our new Valve Clinic has started. This is the last facility needed for the S-IC program for ME Laboratory. The old valve clinic was too small to accommodate the big valves for the S-IC. Contractor is Marbury and Pattillo, Birmingham. Total price: $244,000. Completion date: March 6, 1964.

4. Visit to Grumman Aircraft Corporation: As previously reported, the Grumman Aircraft Corporation has asked us to visit with them and discuss with their manufacturing engineers techniques for 2219 aluminum alloy for welding, chemical milling, surface treating, age forming, etc. This trip took place last week. It was a very successful meeting with valuable and interesting distussions. The Grumman people want to continue this exchange of experience. They will attend the A.O.A. (Army Ordnance Association) Meeting here in Huntsville at the end of October.

- These are the last NOTES from M-SAT - B 10/7

NOTES 9-30-63 LANGE

1. SATURN I: S-IV-6 - Stage arrived at SACTO via Pregnant Guppy 9-27-63.

S-IV Contract Realignment - DAC will present the cost data to MSFC on 9-30-63. This realignment will now be considered in line with the SATURN I operation program curtailment. A contract realignment will still be required but it may be a different type.

SATURN I Operational Program Curtailment - Meeting on 9-28-63 with the Laboratories and the Project Office on the SATURN I Operational Curtailment established the following schedule:

1. September 28 - Ground Rules Established.
2. October 7 - Submission to Project Office by Labs.
3. October 11 - Review Draft by M-DIR.
4. October 12/13 - Print Final Copy.
5. October 14 - Submission to OMSF.

Guidelines for the study consider the following:

1. Launch through SA-10 on Marshall target schedule.
2. Earliest manning of SATURN IB.
3. Minimum SATURN I cost for FY-64, FY-65.
4. Conversion and/or realignment of SATURN I hardware to SATURN IB.
5. Optimum utilization of test stand and launch facilities.
6. Vehicle performance considerations including level of automation, minimum S-IV scope changes and possible elimination of SATURN I EDS.

2. SATURN V: S-IC - A decision was made to establish a centralized Data Reduction Facility at Slidell to be used by prime contractors at Michoud.

A purchase order for S-IC Retro Rockets for $1.89 Million was received from Boeing. Its approval is anticipated by the end of the week.

S-II - Negotiation on Amendment #5 Contract NAS 7-200 ($20 Mill increase) were initiated at MSFC on 9-24-63.

The Navy has developed a plan for providing facility area in the vertical assembly building on schedule by 11-22-63. Although NAA progress in other fabrication areas such as bulkhead assembly is behind schedules, NAA insists that they have joint occupancy as agreed two months ago.

Instrument Unit - Information was received from Headquarters that the procurement plan for the IBM Systems Integration effort was returned from Dr. Seamans to Dr. Mueller. (Documents approved) B

The Data Adapter Procurement Plan, returned by mistake with the IU Systems Integration Procurement Plan on 9-26-63, was returned to Dr. Seamans with memo from Dr. Mueller.

NOTES 9-30-63 MAUS B w/7

FY 65 BUDGET

September 26 Meeting With Dr. Mueller - In follow up of our local presentations to Dr. Seamans on the FY 64 and FY 65 budget submission, additional presentations were given on September 26 in Washington to Dr. Mueller and his top staff. Additional information was furnished as follows: (a) cost history, (b) methods of cost estimation, and (c) justification for detailed cost estimates. The presentations were given by Project Directors and Stage Managers.

As a result of the meeting and in absence of better data, OMSF decided to forward to Dr. Seamans our FY 65 requirements budget based on our MSFC target schedules. We may expect Dr. Seamans' reaction shortly.

Regardless of this, Dr. Mueller has requested his staff to conduct studies as follows:

SAT I - (a) Consider the impact of a possible additional spacecraft slip of 6 months, and (b) possible discontinuation after flight SA-10. ✓

SAT V - Possibility of condensing the latter portion of the program into a shorter time frame. (Our Marshall Target Schedule proposes flights on three-month Centers.) ✓

PERT

The next NASA PERT and Companion Cost Coordination Meeting is to be held at MSFC on November 6 and 7. Some 50 or 60 representatives from other NASA centers, the headquarters, and MSFC are expected to attend. Tom Smith is coordinating local arrangements. I hope your schedule will permit you to give the brief welcoming remarks. ✓ yes B

ORGANIZATION, OFFICE OF MANNED SPACE FLIGHT

In support of Mr. Neubert, Joseph Reed and three of his people worked with the OMSF task force on proposed organization of OMSF. They were given information on the tentative agreement made in the Sept. 22, 23 conferences; their role was limited to preparing three papers as follows: (1) concept paper on theory of the new program organization, (2) functional statement for Program Office in Washington, and (3) functional statement for Project Offices in Centers. We expect to receive an official proposal from OMSF on Wednesday, Oct 2, for our comments. ✓

B 10/7

NOTES 9-30-63 MRAZEK

1. H-1 LOW-FUEL PRESSURE-DROP INJECTOR: In a comparison test, this injector was determined to be the most stable of proposed designs. However, it has a loss of approximately 1.4 seconds specific impulse. Since this is unacceptable because of payload requirements, the proposal was disapproved. Performance loss must be made up prior to injector incorporation.

2. AIR AUGMENTATION CLUSTER FIRING SUCCESSFUL: Two checkout firings, five and forty-five seconds, were completed on the 12,500-pound LOX/RP-1 engines. It is believed that this twelve-engine cluster is the largest number of liquid rocket engines ever fired simultaneously in a clustered arrangement. (See attachment #1)

3. J-2 ENGINE: Engine system development testing has decreased sharply due to a changeover from Block II to Block III engine hardware.

4. H-1 ENGINE: Preliminary investigation of redesign required to increase the thrust level of the H-1 engine from 188,000 pounds to 200,000 pounds indicates that the high-pressure fuel system flange connection may require some "beef-up." The turbopump mounting hardware will also require minor "beef-up." Stress analysis on the remaining engine components is in progress; however, the need for any major redesign is doubtful. In-house studies of engine performance and vehicle structures are in progress to determine the compatibility of an uprated engine with the present S-IB stage design.

In order to phase the uprating program to incorporate the uprated engine early into desired vehicles of the S-IB block, I gave a tentative "go ahead" realizing that some studies still have to be finished.

5. KIWI-B-4D DESIGN REVIEW: The Space Nuclear Propulsion Office/Los Alamos Scientific Laboratories (LASL) will conduct a design review on the KIWI-B-4D reactor on 10-7/9-63. This reactor will be hot-tested in early spring. Personnel from this laboratory will participate in the review, as requested by LASL.

6. WIND LIMITATION: (Reference NOTES 9-16-63 GRUENE, paragraph 3.) See attached memorandum from Chief, Structures Division.

Attachment #1: Air Augmentation Cluster Model
Attachment #2: NOTES 9-16-63 GRUENE
Attachment #3: Memorandum

Air Augmentation Cluster Model - Final checkout has been completed on the twelve engine cluster fabricated by M-P&VE for the NASA-Air Force test program.

Marshall Space Flight Center has entered into a cooperative research program with the U.S. Air Force to investigate the effects of clustered engines on the air augmentation phenomenon.

The investigation will be conducted at the Air Force wind tunnel facilities of the Arnold Engineering and Development center. The Martin-Denver Company has been funded by the Air Force to design the test program and perform the technical evaluation and analysis. Marshall will supply a basic propulsion system consisting of twelve 500 lb., LOX/RP-1 engines and the associated hardware necessary to operate the system.

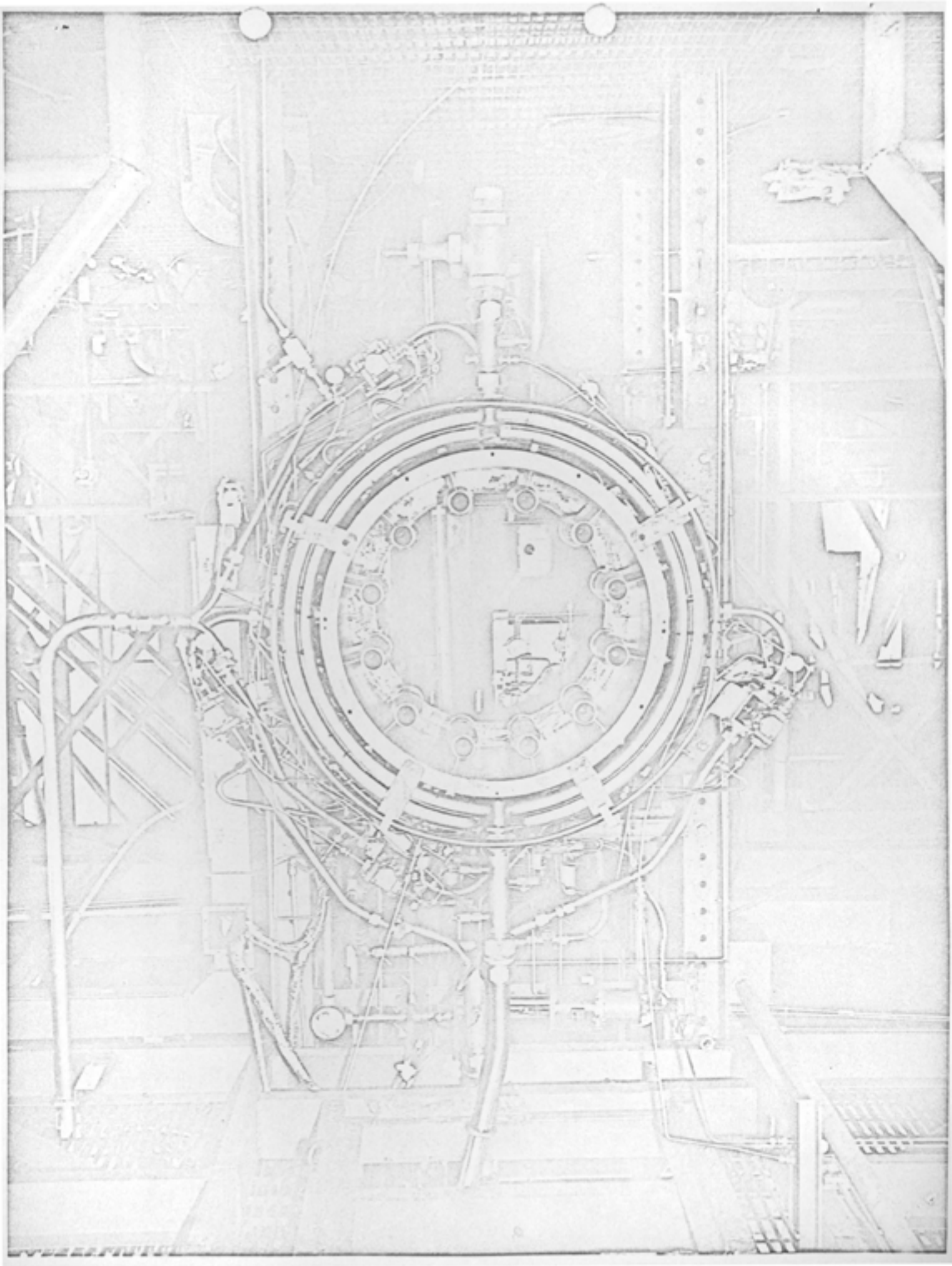
The twelve engines are clustered in a ring-like configuration approximately 22 inches in diameter about a centerbody. The entire cluster is housed within a cylindrical shroud 30 inches in diameter. A diverging shroud will be attached to the rear of the cylindrical housing and the mixing process between the rocket exhausts and atmospheric air will take place within this duct.

The basic principle of the air augmentation concept envolves a mixing process between the hot, high velocity, rocket exhausts and the relatively cool, low velocity atmosphere. This mixing process is contained in and controlled by a mixing shroud attached to the rear of the booster vehicle. Thrust augmentation results from the energy transfer between the two flow mediums, but a weight penalty is imposed by the addition of the mixing shroud to the vehicle.

Attachment #1

The primary purpose of the study is to investigate a multiple rocket exhaust mixing process within a common shroud as opposed to that of a single rocket exhaust within a single shroud. It is felt that due to the larger mixing surface area, the multiple exhausts will create a much more efficient mixing process with the inducted air and thereby enable the mixing process to be completed in a shorter (and consequently lighter) shroud.

It is believed that the cluster for this program is the largest number of liquid rocket engines ever fired simultaneously in a clustered arrangement.



B 9/16

NOTES 9-16-63 GRUENE

1. SA-5 Schedule: We were not able to work out more details to establish a firm firing date. I sent Mr. Moser to Sacramento last week and I hope our preliminary schedule can be firmed up now. ✓

2. Chrysler Meeting: I had a meeting with Messrs Lowrey and Yount of Chrysler to discuss their mission and support assignment. Mr. Cooper of M-SAT attended. A modified scope of work proposal was sent to Col James' office and I hope the Chrysler contract can be firmed up soon. ✓

3. Wind Limitations: The wind limitations on Saturn I, Block II vehicles as mentioned last week in my Notes concerning on pad preparations only were not known to us nor to Astrionics. Modifications in the electrical networks seem mandatory and are now being worked out between P&VE, Astrionics, and LVO. (Please do not include this item in TWX to Dr. Mueller.)

→ H.F.
— Does this affect SA-5?
— Was goofed here? How can recurrence be avoided?
— Why do wind limitations lead to network changes? Because of pressurization needs? B 9/16

Attachment #2

GEORGE C. MARSHALL SPACE FLIGHT CENTER
HUNTSVILLE, ALABAMA

Memorandum

TO Dr. Mrazek, Director Propulsion and Vehicle Engineering Laboratory, M-P&VE-DIR

DATE September 26, 1963

FROM Chief, Structures Division, M-P&VE-S

SUBJECT Pressurization Requirements for the Saturn I, S-I Stage RP-1 Fuel Tanks to Withstand Ground Winds Prior to Launch.

1. Early in the design phase of the S-I Stage, Saturn I, Block I Vehicle, the complexity of determining the distribution of external loads throughout the clustered tank arrangement was recognized. In order to meet the design drawing release dates many simplifying assumptions were made in the primary external and internal load analysis. The distribution of external loads on the outer 70" tanks was determined by using an assumed percentage distribution relationship of the total S-I Stage external loads. It was also assumed that the shear forces introduced at the ends of the 70" tanks due to the deflections of the spider beam assembly, relative to the thrust structure, would be small and they were neglected.

2. During the structural testing phase of the Block I program a series of flight load conditions were applied to the "short booster" configuration. This test configuration was extensively instrumented and loaded to simulate the design flight conditions. The results of these tests indicated very close agreement with the internal loads distribution analysis.

3. Chrysler Corporation, Detroit, was awarded a contract to complete the stress analysis on the S-I Stage, Saturn I, Block I Vehicle. Chrysler calculated the internal loads distributions using a matrix energy structural analysis method. This method indicated that the shear forces induced at the ends of the 70" tanks added considerably to the bending moments on the outer tanks. However, using the external loads available at that time and incorporating the additional moment due to the induced shear, the outer tanks were still not critical for any design condition.

4. Realizing the significance of this induced shear load, the MSFC internal loads distribution analysis was refined to include this effect. Also, for the Saturn I, Block II Vehicle, wind tunnel data allowed the use of realistic distribution of external loads rather than the previously assumed distributions. Pressure distributions on the outer 70" tanks were obtained from a wind tunnel test that did not allow flow around the inner 105" tank. This data indicated a total drag coefficient of 0.56 for the cluster.

Attachment # 3

SUBJECT: Pressurization Requirements for the Saturn I, S-I Stage RP-1 Fuel Tanks to Withstand Ground Winds Prior to Launch. September 26, 1963

5. These external loads were run through the revised internal loads distribution analysis and the skin gages were sized from these distributions, using a safety factor of 1.4.

6. The design drag coefficient for the booster is 1.2 for total vehicle bending moment calculations. Using the pressure distribution that gives a .56 drag coefficient and uprating this value to 1.2 increases the loads to a factor approximately 3 times the value to which the 70" diameter tanks were designed. Checking with Aero-Astro-Dynamics Laboratory, we found that this assumption was incorrect. Using better data from Aero-Astro-Dynamics Laboratory and only upgrading the wind tunnel test to reflect the change in dynamic pressure, the loads are drastically reduced. The 70" diameter fuel tanks will still experience a negative margin of safety when the vehicle is subjected to a 99.9% probability ground wind condition using a 1.4 factor of safety.

7. SA-5 through SA-10 will not require pressurization for the 99.9% probability ground wind condition to maintain a 1.25 safety factor for the present loads as established for unmanned vehicles. SA-111 and subsequent will require pressurization of 5 psig for the fuel tanks at any time a man is on board in the command module.

8. It is recommended that the wind tunnel test now being performed to define the pressure distributions around the separate tanks for the high dynamic pressure region be continued in a low speed tunnel to provide the first data with air flowing between the tanks.

G. A. Kroll

B10/7

NOTES 9/30/63 RUDOLPH

No Notes

NOTES - 9/30/63 - SHEPHERD

Facilities Managers Conference: Bob Long conducted a Facilities Managers Conference at Houston on September 26 and 27, at which representatives from the facilities groups of all NASA Centers attended. High level participation was given at this meeting by all Centers, General Hayes and General Dunn represented the Corps of Engineers and Mr. Diaz represented Office Manned Space Flight. The meeting served a very useful purpose to bring together facilities people from all installations to discuss and air their common problems. Additional meetings will be scheduled by Mr. Long every 6 months. The host will be rotated between the Centers. The most important point made at the meeting was by Mr. Long in regard to the November 1 Centers Directors meeting with Mr. Webb. Bob Long has been assigned 1 hour on the program. In his words, he wants to present a story that "will shake up the Centers Directors". Basically, the point will be that the rate of CofF obligations is considerably below the rate that was originally projected when Congress authorized the funds. If the present rate continues NASA has a 7 year work load in front of them. This information presented by Long requires clarification and careful validation. We are in the process now of validating this information for each one of the Marshall locations. I would like to make a short briefing on this subject to you and Mr. Rees in approximately 3 weeks (prior to the November 1 meeting). Fortunately I was appointed chairman of the committee to arrive at agenda items for Mr. Long for the November meeting. The items proposed by the committee were of a nature whereby I believe some good can be accomplished.

RIFT Facilities Activities for FY-64: Studies and concepts for RIFT facilities are being handled as a joint Lockheed/MSFC effort for FY-64. The intent is to ensure that facilities activities are positively directed by active participation of MSFC personnel, avoiding the "recycling" usual to a "submit-review-resubmit" operation. MSFC will establish and approve the work to be done, although the MSFC engineers, in the joint effort, will work as a part of the Lockheed team. This management approach has the support of NASA Headquarters and Nuclear Vehicle Project Office. In addition, personnel from Manufacturing Engineering and Quality Assurance will participate as working members in the joint effort, and representatives from all laboratories will be called in to consult and review on a continuing basis to further assure that the facilities efforts are in consonance with MSFC "know-how".

B 10/7

NOTES 9-30-63 Stuhlinger

1. SUPPORTING RESEARCH PROGRAMS: Reply to your question of September 16, 1963. See attached NOTES 9-16-63.

Program authority for the 70 OMSF tasks (FY 64) approved by Dr. Seamans was originally promised for September 15. However, it has not come in yet; we believe that it is still in Bill Lily's office. Fourteen more OMSF tasks were approved by OART, but these tasks have not yet been signed off by Dr. Seamans. We do not yet know how many more OMSF tasks will be approved by OART. A group of 7 people from Headquarters (OART & OMSF) will visit here October 2 to discuss questions of this nature with Marshall personnel.

2. USE OF METRIC UNITS (MKSA SYSTEM) IN RPL: This Laboratory has adopted the policy of using MKSA units in all reports to be published by RPL, or through contracts for RPL. Copies of the memorandum which implements this policy will be sent to other MSFC laboratories and offices for information. Adoption of the same or a similar policy throughout MSFC is recommended.

E.S.,
It has been so directed 6 months ago. (Speer prepared the paper)
B

3. TECHNOLOGY UTILIZATION PROGRAM: We stated in the NOTES of 9-3-63 that 11,000 copies of "Welding Tips" have been distributed so far. Headquarters is presently negotiating a contract with the "Harvard Business Review" to evaluate the worth of the booklet to industry.

NOTES 9-16-63 Stuhlinger

B 9/17

1. SUPPORTING RESEARCH PROGRAMS: The FY-65 detail budget submission was completed and forwarded to FMO for those programs for which I have program manager responsibility. The Headquarters guidelines for FY-64 were as follows:

OMSF	$13.4 M
OART	9.334 M
OSS	.970 M
TOTAL	$23.704 M

OART has forwarded a list of FY-64 approved tasks and this information has been forwarded to the laboratories. The total FY-64 program authority has not been received. Its amount is still unknown.

The latest official word from Headquarters Office of Manned Space Flight is that 70 Launch Vehicle Supporting Technology research tasks have been approved for the sum of 5.08 million, and signed off by Dr. Seamans. The program authority to fund these tasks is due at MSFC the week of September 15, 1963. This is less than half the total number of tasks submitted to Headquarters last May. The funding guidelines that were sent to us for FY-64 totaled 13.4 million, which, in our opinion, is 4 million short of the requirements at Marshall. Now, with only a 5 million dollar program being approved, it appears that the Launch Vehicle Supporting Technology research program is regressing to a new low.

E.S. Is this FY64? How final is that? B

2. RADIATION EFFECTS ON DETECTOR PANELS FOR METEOROID MEASUREMENT: Tests completed at Ling-Tempco-Vought in Dallas have been analyzed. Of about 3,000 individual discharges by electron irradiation, no pulses greater than 6 volts were noted. High frequency pulses of 30 to 40 volts were common. Conferences with Fairchild Stratos Corporation electronic design engineers indicate that discrimination between the irradiation pulses and meteoroid pulses can be effected by relatively minor changes to the electronics systems currently planned. FSC will have a "breadboard" model available for tests at L.T.V. on Thursday, 19 September. Dr. Johnson will participate in this test series.

We feel that the problem of the space radiation environment most probably is less severe than was concluded on the basis of earlier Langley observations. RPL and L.T.V. are currently conducting additional tests to further verify present results. Rates of spurious pulses seem less frequent at the low radiation dosage of space than was assumed by the Langley group.

3. ALSS PAYLOAD STUDIES: A report entitled "Scientific Packages for Apollo Logistic Support System Payloads," written by Dr. Alfred Weber and Mr. George Bucher of RPL has just been released. This report describes in detail the scientific experiments and instruments required for ALSS (LEM and Saturn V) payloads. This report will satisfy a request from the Office of Space Sciences for our proposed ALSS scientific program and will provide a basis for other segments of MSFC to continue their conceptual design efforts on ALSS payloads.

E.S. Please send me a copy B